FOREWORD

Material contained herein was obtained from many sources, for example, early bulletins of the College of Engineering from the main library, minutes of the Board of Trustees meetings, minutes of the faculty meetings of the College of Engineering, papers, documents, and letters by Dr. James R. Withrow and the undersigned, and sources from the memory of the undersigned.

Acknowledgement is made to the many who have helped out in this book: Dr. Syverson, Chairman of Chemical Engineering Department, John Rensel, Miss Nancy Bole, and Miss Jane Sullivan.

A more comprehensive history will be written including photographs already obtained from the alumni and classification of Chemical Engineers by company and work function. This volume gives such a classification for 1958.

Joseph H. Koffolt

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HISTORY OF THE CHEMICAL ENGINEERING DEPARTMENT 1899 - 1969

BY

JOSEPH H. KOFFOLT

6-23-69.

Preview

The curricula in Chemical Engineering, the administration and the name of the degree have gone through several changes.

The records indicate that the first degree was awarded to Samuel Vernon Peppel in 1899. The degree was called "B.S. in Chemistry from the Engineering College."

The 1899-1900 bulletin gave the objectives as "The objective of this course is to prepare the students for work in Industrial Chemistry or Metallurgical Chemistry according to the electives chosen, with proper electives it will be found a desirable course for students expecting to become Analytical Chemists."

This degree was awarded to C. P. Linville in 1900; to seven students in 1901 including A. V. Bleininger, who was later on the staff of the Department of Ceramic Engineering. Five students received the above degree in 1902; three in 1903 and four in 1904. There is some question as to whether or not the graduates from 1899 to 1904 were Chemical Engineers. Dr. James R. Withrow asserted that they were not. They might be designated as Industrial Chemists.

The 1901-1902 bulletin gives for the first time the following statement: "The course will include lectures on Industrial Chemistry as practicable as possible with plant visits and lectures by specialists."

The 1902-1903 bulletin lists for the first time "The Outline of the Course in Chemical Engineering." The degree was still "Bachelor of Science in Chemistry in the College of Engineering." The objectives are given in this bulletin.

OUTLINE OF THE COURSE IN CHEMICAL ENGINEERING. DEGREE B.Sc. IN CHEMISTRY

"This course has been prepared to meet the growing demand for trained men in the numerous industries which are based upon chemical processes or employ them prominently in their work, and which are not included in the fields of metallurgy and ceramics.

The student begins his chemical work in the first year with general inorganic chemistry and qualitative analysis. This is followed in the second year by a course in quantitative analysis and a continuation of general chemistry; and in the third year by metallurgical analysis and organic chemistry. In the fourth year a course in industrial processes with laboratory work in inorganic preparations is required, together with a term's work in each in sanitary analysis of water and air, and in the elements of the ceramic industry, and two terms in physical chemistry. In addition to this, several options are offered in metallurgy, agricultural chemistry and mechanical engineering.

On the engineering side, mathematics is carried through three years; drawing, including free hand, mechanical and technical, is also required through three years. Physics is required in the first two years, mechanics in the third, and machine designing in the fourth. A term in the electrical laboratory forms a part of the fourth year's work.

Two years of English and a year of either French or German is required of all engineers. In view of the large chemical literature in the German language all students in the Chemical Course will find it almost necessary to select the German..

Shopwork Courses (7) 3 and (11) are to be taken in Summer Term, at the end of the First or Second Year."

In 1904 the name of the degree was "Bachelor of Science in Chemical Engineering." In 1906 the first two recipients of this degree were: The late Arno Fieldner and Lewis Benjamin Case. The name of the degree was changed in 1916 to Bachelor of Chemical Engineering. In 1973 the degree will be changed to Bachelor of Science in Chemical Engineering. Effective June, 1969, the Departments of the College of Engineering will go back to the four year program, and the degree will be designated as "Bachelor of Science in Chemical Engineering."

THE DEPARTMENT OF CHEMICAL ENGINEERING.

Chemical Engineering was a division of the Chemistry Department from 1902 to October, 1924. This was true of most Chemical Engineering Departments at many other institutions in the country. The beginning of chemical engineering education is usually attributed to M.I.T. where the first course in Chemical Engineering was started in 1888. At the turn of the Century there were chemical engineering curricula at the University of Wisconsin, the University of Michigan, Armour Institute of Technology (now known as Illinois Institute of Technology) and Columbia University. Some claim that the first curriculum was at Rose Polytechnic Institute in Terre Haute, Indiana, before 1888.

ACTION OF THE FACULTY AND BOARD OF TRUSTEES IN THE FORMATION OF THE CHEMICAL ENGINEERING DEPARTMENT

On June 5, 1924, at a College of Engineering Faculty meeting, Professor Magruder made the motion listed below. It was seconded by Professor Norman. Both men were from the Department of Mechanical Engineering.

"Whereas the separation of Chemical-Engineering from the Department of Chemistry and the establishment of a Department of Chemical-Engineering is approved by the Department of Chemistry and the Professor of Chemistry; and

Whereas it is thought that the interests of the Department of Chemistry, of Chemical-Engineering, and of the College of Engineering will be best served by the establishment of a Department of Chemical-Engineering:

Resolved by the Faculty of the College of Engineering that it approves the establishment of the Department of Chemical-Engineering and respectfully recommends that the President of the University approve and the Board of Trustees authorize the establishment of a Department of Chemical-Engineering at this University."

On September 6, 1924, the Board of Trustees passed the following resolutions:

"That the plan for division of the Department of Chemistry be approved and a division of Chemical Engineering be authorized, subject to the following terms and conditions:

(1) The Dean of the College of Engineering shall present to the President of the University for his approval a complete list of all courses in Chemical Engineering that should be transferred to the new department hereby created, and also a complete report upon the organization of courses for the two departments.

(2) New courses in the Department of Chemistry shall not be authorized when they parallel or duplicate the courses given in the Department of Chemical Engineering or the courses transferred, nor shall the courses in the new Department of Chemical Engineering parallel or duplicate the courses hereafter to be given in the Department of Chemistry.

(3) The division of this department shall not be taken as authority for any expansion in courses offered not authorized by the budget.

Professor James R. Withrow is hereby appointed head of the Department of Chemical Engineering."

MINING AND PETROLEUM ENGINEERING.

On May 7, 1877, an act was established for a School of Mines and Mining in the Ohio Agricultural and Mechanical College.

About 1925 the curriculum in Petroleum Engineering was established. Professor Edward V. O'Rourke, a graduate of Mining Engineering, headed up the work in Petroleum Engineering as instructor and later Professor. He organized a four year and then a five year program dealing with Petroleum and Natural Gas-Exploration-Production-Transport Valuation.

June, 1954, all the curricula in the College of Engineering were inspected by E.C.P.D. (Engineering Council of Professional Development). All the curricula were accredited with the exception of Petroleum and Mining Engineering. On March 10, 1955, the Executive Committee met to deliberate upon the problem facing the College as a result of the loss of accreditation by Petroleum Engineering. On November 19 the Executive Committee of the College of Engineering made the following recommendation to the Council on Instruction. The Council approved the recommendation of the College of Engineering to abolish the Department of Mining and Petroleum Engineering, and to shift the curriculum in Petroleum Engineering to Chemical Engineering, and the curriculum in Mining Engineering to Metallurgical Engineering. The Board of Trustees approved this on April 29, 1956. In the meantime, Professor H. C. Slider, Petroleum Engineer with Shell Oil Company, joined the Petroleum Engineering staff. The curriculum in Petroleum Engineering was accredited by E.C.P.D.

The enrollment in Petroleum Engineering was very low, and the future did not seem bright. In January, 1960, Professor O'Rourke, who was Acting Chairman of Petroleum Engineering, resigned and requested to go on Emeritus Status. This was approved. To maintain accreditation status, common sense indicated that Professor O'Rourke would have to be replaced and, in addition, it would be necessary to add another staff member to come up to the standards of the American Institute of Chemical Engineers. The cost for such few students would be prohibitive. Therefore, a formal recommendation was made to the Executive Committee of the College of Engineering to abolish the curricula in Petroleum Engineering but to have an option or a program in Chemical Engineering. This was presented to the Committee on Engineering Instruction, who recommended approval. The following was approved by the Board of Trustees on March 15, 1962.

COLLEGE OF ENGINEERING - CHANGE OF THE PETROLEUM ENGINEERING CURRICULUM AND DEGREE PROGRAM TO A PROGRAM OF COURSES IN PETROLEUM ENGINEERING WITHIN THE CHEMICAL ENGINEERING CURRICULUM

"During the past several years the enrollment in the Petroleum Engineering curriculum has dropped to a very low level and a careful study of the situation has been made by the Dean of the College of Engineering, the Executive Committee of the College, and the Chairman of the Department of Chemical Engineering. Representatives of the petroleum industry and other educators in Petroleum Engineering have also been consulted on all aspects of the problem.

On the basis of this study, it has been concluded that the demand for Petroleum Engineering graduates in Ohio is not sufficient to justify the heavy investment by the University that would be required to maintain an accredited curriculum leading to a degree in Petroleum Engineering, and that as an alternative, elective and graduate courses in Petroleum Engineering should be maintained to provide opportunities for students in Chemical Engineering and in other departments to supplement their education with courses unique to the technology of petroleum related industry.

Therefore, upon the approval of the Faculty of the College of Engineering, the Council on Instruction, and the Faculty Council, it is recommended that effective Autumn Quarter 1962: (1) the curriculum leading to the degree Bachelor of Petroleum Engineering be abolished, (2) the combined curriculum leading to the combined degrees, Bachelor of Petroleum Engineering and Master of Science, be abolished, and (3) the degree Bachelor of Petroleumn Engineering be abolished. This recommendation is presented with the understanding that a program of courses in Petroleum Engineering will be maintained within the Chemical Engineering curriculum."

1903 CURRICULUM IN CHEMICAL ENGINEERING

SUBJECT	COURSES	TOTAL QUARTER HOURS
MATHEMATICS:	Algebra (5), Trigonometry (5), Analytic Geometry (5), Calculus (15)	30
MECHANICS:	Statics (5), Strength of Materials (5), Kinetics and Hydraulics (5)	15
CHEMISTRY:	Inorganic (16), Quantitative Analysis (4), Quantititative Chemistry (12), Organic (15), Sanitary (4), Physical (6)	57
CHEMICAL ENGINEERING OR INDUSTRIAL CHEMIST:	Stoichometry (2), Industrial Chemistry (8)	10
MODERN LANGUAGES:	French, German, Spanish (12)	12
ENGLISH:	Composition (6), Rhetoric (6), Public Speaking (1.5)	13.5
PHYSICS:	Mechanic (3), Electricity and Magnetism (3), Light and Sound (3)	9
ENGINEERING DRAWING:	Freehand (4), Lettering (3), Projections (3), Descriptive Geometry (3), Technical Drawing (6)	19
METALLURGY:	Mineralogy (3), Metallurgy Lab (5)	8
MECHANICAL ENGINEERING:	Power Plants (5), Machine Design (15)	20
ELECTRICAL ENGINEERING:	Lecture (2), Lab (2)	4
CERAMICS:	General Principles (5)	5
ELECTIVES:	(20) Chosen from Metallurgy, Chemistry, Mechanical Engineering, and Agricultural Chemistry	20
SHOP WORK:	Carpentry, Pattern Making, Forging, (summer quarter-three hours a day for six days a week for each)	
THESIS:	In Fields of Chemistry, Chemical Engineering, Metallurgy, or Mineralogy (6)	6
MILITARY SCIENCE (6) and GYMNASIUM (3)		9
Grand Total		237.5

COURSE IN CHEMICAL ENGINEERING

Degree B.Sc. in Chemistry from Engineering

Curriculum 1902-1903

FIRST YEAR

First Term	Cr. Hrs.	Second Term	Cr. Hrs.	Third Term	Cr. Hrs.
Algebra	5	Trigonometry	5	Math (Analytics)	5
Inorganic Chem.	5	Inorganic Chem.	5	Qualitative Analysis	4
Modern Language Fr. Ger. Sp.	4	Modern Language	4	Modern Language	4
Composition	2	Compositon	2	Composition	2
Public Speaking	1/2	Public Speaking	1/2	Public Speaking	1/2
Freehand Drawing	2	Freehand Drawing	2	Lettering	3
Drill and Gym		Drill and Gym		Drill	

Shopwork 7 and 11 in summer following first or second year.

Note: Thesis must be written and filed before receiving degree.

SECOND YEAR.

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.	Chemistry (20) Quantitative.	4.
Chemistry (21) Inorganic.	2.	Chemistry (21) Inorganic.	2.	Chemistry (21) Inorganic.	2.
Physics (2) Mechanics, Heat.	3.	Physics (2) Elect'y, Magnetism.	3.	Physics (2) Light, Sound.	3.
Mathematics (41) Calculus.	5.	Mathematics (42) Calculus.	5.	Mathematics (43) Calculus.	5.
Drawing (3) Projections.	3.	Drawing (3) Descriptive Geom.	3.		
Chemistry (31) Stoichiometry.	2.			Metallurgy (2) Mineralogy.	3.
Drill and Gymnasium.		Drill and Gymnasium.		Military Drill.	

THIRD YEAR.

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Chemistry (8) Organic.	5.	Chemistry (9) Organic.	5.	*Chemistry (9) Organic.	5.
Metallurgy (5) Laboratory.	5.	Metallurgy (6) Assaying.	5.	*Metallurgy (5) Laboratory.	5.
Rhetoric (2) Expository Writing.	2.	Rhetoric (3) Brief-Making, etc.	2.	Rhetoric (3) Brief-Making, etc.	2.
Mathematics (71) Statistics.	5.	Mathematics (72) Strength Mat'ls, Kinet's.	5.	Mathematics (73) Kinetics, Hydraulics.	5.
Drawing (21) Technical.	2.	Drawing (22) Technical.	2.	Drawing (23) Technical.	2.
				Mech. Eng. (32) Power Plants.	5.

*Students are to elect either Chemistry (9) 5, or Metallurgy (5) 5.

FOURTH YEAR.

First Term.	Credit hours	Second Term.	Credit hours	Third Term.	Credit hours
Chemistry (32) Industrial.	4.	Chemistry (32) Industrial.	4.	Chemistry (15) Sanitary.	4.
Mech. Eng. (18) Machine Design.	5.	Mech. Eng. (18) Machine Design.	5.	Mech. Eng. (19) Machine Design.	5.
Elec. Eng. (6) Lectures.	2.	Chemistry (30) Physical.	3.	Chemistry (30) Physical.	3.
Elec. Eng. (7) Laboratory.	2.	*Mech. Eng. (35) Laboratory.	5.		
*Metallurgy (4) Fuels and Iron.	5.	*Metallurgy (4) General.	5.	Ceramics (16) General Principles.	5.
*Ag. Chemistry (4) Laboratory.	5.	*Ag. Chemistry (4) Laboratory.	5.		

*Students are to elect Metallurgy (4), two terms; Agricultural Chemistry (4), two terms or Metallurgy (4) first term, and Mechanical Engineering (35).

1968-1969 Curriculum - Five Year Program - Chemical Engineering

SUBJECT	COURSES	TOTAL QUARTER HOURS
MATHEMATICS:	Calculus (20), Differential Equations (5) Fourier Series and Boundary Value Problems (3)	28
CHEMISTRY:	General (12), Quantitative (5), Physical (9), Physical Lab. (3), Organic (9), Organic Lab. (6)	44
ENGINEERING GRAPHICS:	I and II (6), Chemical Plant Design (3)	9
COMPUTER UTILIZATION:	(3)	3
ENGLISH:	Composition and Reading (9)	9
PHYSICS:	Mechanics (5); Heat, Sound, Light (5); Electricity and Magnetism (5)	15
ENGINEERING MECHANICS:	Statics (5), Strength of Materials (5)	10
CHEMICAL ENGINEERING:	Process Calculations (6); Transport Phenomena I, II, and III (9); Thermodynamics (6); Unit Operations (4); Measurements and Control (3); Kinetics (3); Unit Operations Laboratory (8); Inspection Trip (2); Processes (3); Economy (3); Professionalism (1); Process Development (4); Practice Work (5); AIChE National Student Contest Problem (2); Process Design (3)	62
MINERALOGY:	Crystallography and Descriptive (5)	5
METALLURGICAL:	Corrosion (3)	3
ELECTRICAL ENGINEERING:	(4), Industrial Electronics and Controls (4)	8
BASIC EDUCATION REQUIREMENTS:	Natural Science (5), Social Sciences (15), Humanities (15)	35
TECHNICAL ELECTIVES:	Chosen from technical courses in Chem. Engr. Polymer, Engineering, Petroleum Reservoir Engr., Nuclear Engr., Air Pollution, Chemistry, Physics, Chemistry, Metallurgy, Mineralogy, Chem. Engr. Mathematical Models, other sciences and Engineering.	20
MISCELLANEOUS:	Physical Education (3), Health Education (1), R.O.T.C. or alternative (12)	16
Grand Total		267

1968-1969 Curriculum - Five Year Program - Chemical Engineering

1946-1969

PRE-ENGINEERING DIVISION

First Year

	Course	HOURS
AUTUMN	Math[1] 151 Calculus	5
	Chem. 111 General	4
	Eng. Gr.[2] 111 Graphics I	3
	English 101	3
	Survey of Engineering 101	1
	Physical Education 101	1
	Option[6] (ROTC or Academic)	
WINTER	Math. 152 Calculus	5
	Chem. 112 General	4
	Eng. Gr.[2] 112 Graphics II	3
	English 102	3
	Health Education 101	1
	Physical Education 102	1
	Option[6] (ROTC or Academic)	
SPRING	Math. 153 Calculus	5
	Chem. 113 General	4
	Basic Education Requirement[4]	
	English 103	3
	Survey of Engineering 102	1
	Physical Education 103	1
	Option[6] (ROTC or Academic)	

Second Year

	Course	HOURS
AUTUMN	Math. 254 Calculus	5
	Physics 231 Mechanics	5
	Chem.[3] 221 Quantitative Analysis	5
	Basic Education Requirement[4]	
	Option[6] (ROTC or Academic)	
WINTER	Math. 255 Differential Equations	5
	Physics 232 Heat, Sound, Light	5
	Eng. Mech.[5] 210 Statics	5
	or	
	Eng. Mech.[5] 200 Computer Programming	3
	Basic Education Requirement[4]	
	Option[6] (ROTC or Academic)	
SPRING	Physics 233 Electricity and Magnetism	5
	Eng. Mech.[5] 200	3
	or	
	Eng. Mech. 210	5
	Basic Education Requirement[4]	
	Options[6] (ROTC or Academic)	

[1]Mathematics Requirement: Each student entering the College of Engineering is placed in the most advanced mathematics course for which he is prepared, as determined by a mathematics placement examination. Students who are placed in Mathematics 151, calculus, shall follow the mathematics sequence listed in the Pre-Engineering curriculum. Those students with less adequate preparation who are placed in Mathematics 150 shall schedule the following sequence:

Mathematics 150, 151, 152, 153, 254 and 255.

Each student is expected to complete a mathematics course each quarter he is enrolled in the Pre-Engineer-

PROFESSIONAL DIVISION

First Professional Year

	Course	HOURS
AUTUMN	Chem E 400 Chemical Engineering and Process Calculations	3
	Chem 531 Physical Chemistry	3
	Eng Mech 420 Strength of Materials	5
	Elective	3
	Basic Education Requirement	3
		[1]17
WINTER	Chem E 401 Chemical Engineering and Process Calculations	3
	Chem E 520 Elements of Chemical Engineering: Transport Phenomena I	3
	Chem 532 Physical Chemistry	3
	Math 512 Fourier Series and Boundary Value Problems	3
	Basic Education Requirement	3
		[1]15
SPRING	Chem E 521 Elements of Chemical Engineering: Transport Phenomena II	3
	Chem 533 Physical Chemistry	3
	Chem 541 Physical Chemistry Laboratory	3
	Mineral 414 Crystallography and Descriptive Mineralogy	5
	Basic Education Requirement	3
		17
SUMMER	Chem E[4] 489 Summer Practice Work	5

THE PROFESSIONAL DIVISION (Continued)

Second Professional Year

	Course	HOURS
AUTUMN	Chem E 611 — Elements of Chemical Engineering: Transport Phenomena III	3
	Chem E 608 — Chemical Engineering Thermodynamics	3
	Chem 251 — Organic Chemistry	3
	Chem 254 — Organic Chemistry Laboratory	3
	Met E 635 — Corrosion	3
	Basic Education Requirement[2]	3
		18
	See Note Below[4]	
WINTER	Chem E 612 — Chemical Engineering Operations	4
	Chem E 609 — Chemical Engineering Thermodynamics	3
	Chem 252 — Organic Chemistry	3
	Chem 255 — Organic Chemistry Laboratory	3
	Elec E[3] 500	4
		17
SPRING	Chem E 725 — Chemical Engineering Measurements and Control	3
	Chem E 610 — Chemical Engineering Kinetics	3
	Chem 253 — Organic Chemistry	3
	Elec E 540 or Elec E 520 — Industrial Electronics and Controls	4
	Basic Education Requirement	5
		18
	Chem E[5] 685 — Inspection Trip	2

Third Professional Year
(For B.Ch.E. degree only)

	Course	HOURS
SUMMER	Chem E 730 — Chemical Engineering Operations Laboratory	8
AUTUMN	Chem E 761 — Chemical Engineering Processes	3
	Chem E 760 — Chemical Engineering Economy	3
	Chem E[8] 750 — Professional Aspects of Chemical Engineering	1
	Technical Elective[7]	3
	Basic Education Requirement	7
		17
WINTER	Chem E 762 — Chemical Engineering Process Development	4
	Chem E 763 — Analysis and Organization of Special Project Problem Investigations	2
	Technical Elective[7]	9
	Basic Education Requirement	3
		18
SPRING	Chem E 764 — Chemical Engineering Process Design	3
	Eng Gr. 755 — Chemical Plant Design	3
	Technical Elective[7]	8
	Basic Education Requirement	3
		17

Third Professional Year
(For B.Ch.E. and M.S. degrees)

	Course	HOURS
SUMMER	Chem E 730 — Chemical Engineering Operations Laboratory	4
	Chem E[6] 830 — Advanced Chemical Engineering Operations Laboratory	4
	Basic Education Requirement	10
		18
AUTUMN	Chem E[8] 760 — Chemical Engineering Economy	3
	Technical Elective — Graduate Credit Courses	12
	Chem E[8] 750 — Professional Aspects of Chemical Engineering	1
		16
WINTER	Technical Electives — Graduate Credit Courses	13
	Chem E[8] 763	2
		15
SPRING	Technical Electives — Graduate Credit Courses	15

(Receives B.Ch.E degree at the end of the Spring Quarter)

	Course	HOURS
SUMMER—FIRST TERM	Chem E 999 — Chemical Engineering Research	6

(Receives M.S. degree at the end of the Summer Quarter)

1969-1970 Curriculum - Four Year Program - Chemical Engineering
Effective June 1, 1969

SUBJECT	COURSES	TOTAL QUARTER HOURS
BASIC EDUCATION REQUIREMENTS:	Humanities (15), Social Sciences (15)	30
CHEMICAL ENGINEERING:	Process Calculations (6), Transport Phenomena I, II, and III (9), Thermodynamics (6), Kinetics (3), Operations (4), Inspection Trip (2), Chemical Process Control (3), Operations Laboratory (8), Professionalism (1), Economy (3), Process Development (4), Process Design (5).	54
CHEMISTRY:	General (15), Organic (9), Organic Lab (3), Physical (9), Physical Lab (3)	39
ENGLISH:	Composition and Reading (6), Technical Writing (3)	9
ENGINEERING GRAPHICS:	General (4), Computer Utilization (3)	7
ENGINEERING MECHANICS:	Statics and Strength of Materials (5)	5
MATHEMATICS:	Calculus and Analytic Geometry (20), Differential Equations and their Applications (5), Fourier Series and Boundary Value Problems (3)	28
PHYSICS:	Particles and Motion (5), Waves and Quanta (5), Particle Systems and Electrodynamics (5)	15
TECHNICAL ELECTIVES:	Will be chosen with emphasis in one of the following technical areas: advanced engineering and science, environmental engineering, nuclear engineering, optimization and advanced mathematical methods, petroleum reservoir engineering, polymer engineering, process analysis and design, and process dynamics and stimulation. To provide some broadening in technical fields, at least 5 credit hours will be taken outside the Department, preferably in other areas of engineering or in the basic sciences.	18
MISCELLANEOUS:	Physical Education (3), Health Education (1), National Defense Option (6-12)	10-16

Grand Total .... 215 or 221

THE FOUR-YEAR CURRICULUM IN CHEMICAL ENGINEERING EFFECTIVE JUNE 1, 1969

FIRST YEAR

		HOURS
AUTUMN	Chem. 121 General Chemistry	5
	Engl. 101 Composition and Reading	3
	Math. 151 Calculus and Analytic Geometry	5
	Phys. Ed. 101	1
	University College 100 Freshman Survey	1
	National Defense Option[1] ROTC or Academic	
WINTER	Chem. 122 General Chemistry	5
	Eng. Gr. 110 General Engineering Graphics	4
	Math. 152 Calculus and Analytic Geometry	5
	Health Ed. 101 Hygiene	1
	Phys. Ed. 102	1
	National Defense Option[1] ROTC or Academic	
SPRING	Chem. 123 General Chemistry	5
	Engl. 102 Composition and Reading	3
	Eng. Gr. 200 Computer Utilization	3
	Math. 153 Calculus and Analytic Geometry	5
	Phys. Ed. 103	1
	National Defense Option[1] ROTC or Academic	

SECOND YEAR

		HOURS
AUTUMN	Chem. 251 Organic Chemistry	3
	Chem. E. 400 Principles I	3
	Math. 254 Calculus and Analytic Geometry	5
	Physics 131 Particles and Motion	5
	National Defense Option[1] ROTC or Academic	
WINTER	Chem. 252 Organic Chemistry	3
	Chem. E. 401 Principles II	3
	Math. 255 Differential Equations	5
	Physics 132 Waves and Quanta	5
	National Defense Option[1] ROTC or Academic	
SPRING	Chem. 253 Organic Chemistry	3
	Chem. E. 520 Transport Processes I	3
	Physics 133 Particle Systems and Electrodynamics	5
	Basic Education Requirement[2]	5
	National Defense Option[1] ROTC or Academic	

THIRD YEAR

		HOURS
AUTUMN	Chem. 254 Organic Chemistry Laboratory	3
	Chem. 531 Physical Chemistry	3
	Chem. E. 521 Transport Processes II	3
	Eng. Mech. 215 Statics and Strength of Materials	5
	Math. 512 Fourier Series and Boundary Value Problems	3
		17
WINTER	Chem. 532 Physical Chemistry	3
	Chem. E. 608 Thermodynamics I	3
	Chem. E. 611 Transport Processes III	3
	Chem. E. 725 Chemical Process Control	3
	Basic Education Requirement[3]	5
		17
SPRING	Chem. 533 Physical Chemistry	3
	Chem. 541 Physical Chemistry Laboratory	3
	Chem. E. 609 Thermodynamics II	3
	Chem. E. 612 Operations	4
	Chem. E. 685[4] Inspection Trip	2
	Basic Education Requirement[3]	5
		20

FOURTH YEAR

		HOURS
SUMMER	Chem. E. 730 Operations Laboratory	8
		8
AUTUMN	Chem. E. 610 Reaction Kinetics	3
	Chem. E. 750 Profession of Chemical Engineering	1
	Chem. E. 760 Economy	3
	Engl. 305 Technical Writing	3
	Technical Elective Program[3]	3
	Basic Education Requirement[3]	5
		18
WINTER	Chem. E. 762 Chemical Process Development	4
	Technical Elective Program[3]	9
	Basic Education Requirement[3]	5
		18
SPRING	Chem. E. 764 Chemical Process Design	5
	Technical Elective Program[3]	6
	Basic Education Requirement[3]	5
		16

Summary of Requirements for Degree Bachelor of Science in Chemical Engineering

College Requirements

Basic Education Requirements[3]		30
Chem. E.	400, 401, 520, 521, 608, 609, 610, 611, 612, 685, 725, 730, 750, 760, 762, 764	54
Chem.	121, 122, 123, 251, 252, 253, 254, 531 532, 533, 541	39
Engl.	101, 102, 305	9
Eng. Gr.	110, 200	7
Eng. Mech.	215	5
Math.	151, 152, 153, 254, 255, 512	28
Physics	131, 132, 133	15
Technical Elective Program[3]		18
		205

University Requirements

Health Ed. 101, 1 credit hour; Phys. Ed. 101, 102, 103, 3 credit hours; National Defense Option, 6-12 credit hours.

ADDITIONS AND CHANGES IN THE CHEMICAL ENGINEERING CURRICULA 1903-1969

The present day curriculum has gone through many changes since 1903. This can be seen from the summary and curricula of 1903, the Five Year Program (in effect from 1946 to 1969, and the new four year curriculum which went into effect June, 1969 on the pages which follow.

The early curricula emphasized Mechanical Engineering and Engineering drawing. The changes and additions are herewith given.

1. 1904 the course in public speaking was dropped and geometrical and free hand drawing were added.
2. 1905 agricultural chemistry was changed to elective. Thesis was added in third term of the Fourth Year as a no credit course. However, it was a requirement for graduation.
3. The course in Stoichiometry was changed to Problems, 1 credit hour (The work was equivalent to a five hour course - comment by J. H. K.).
4. 1907 General Chemistry became a four hour course.
5. The credit hours of thesis was changed from no credit to six credit hours.
6. The courses in mathematics in the third year as Statics, Strength of Materials and Kinetics were changed to Mechanics, a new department in the College of Engineering.
7. 1908 two hours of elective were added to replace the rhetoric course which was dropped.
8. 1909 changed from quarter system to semester system. In 1909 a weeks inspection trip was required.
9. 1910 the degree was changed from Bachelor of Science to Bachelor of Chemical Engineering. Industrial Chemistry was divided into two hours of lecture and two hours of lab.
10. 1912 Industrial Chemistry was changed from two hour lecture and two hour lab to three hour lecture and one hour lab.
11. 1913 A three hour course of Mineralogy given in Metallurgy was transferred to the new Department of Mineralogy.

ADDITIONS AND CHANGES IN THE CHEMICAL ENGINEERING CURRICULA 1903-1969 (Continued)

12. 1914 the weeks inspection trip became a one credit hour course.

13. 1915 the course in Chemical Plant Design was originated. Dr. James R. Withrow worked with Thomas French in this course.

14. 1919 the course Summer Practice Work was inaugurated.

15. 1921-22 went back to semester.

16. 1923-24 three credit hours of Engineering Drawing were dropped. The credit hours of Mineralogy were increased to six credit hours.

17. 1924 the name of the industrial chemical courses were changed to Chemical Engineering courses.

18. 1925-26 in the course of Elements of Chemical Engineering two credit hours were added.

19. 1927-28 Mechanical Engineering Lab was added and Engineering Drawing in the fall quarter of the fourth year was dropped.

20. 1929-1930 Survey of Engineering was added to the curriculum.

21. 1930-31 Chemical Engineering 712, 713, 714 was inaugurated as an elective although this course was a lab course in Unit Operations. It also covered other work in Chemical Engineering as thermodynamics, graphical methods and so forth.

22. 1933-34 Chemical Engineering round table now known as the Profession of Chemical Engineering was added to the curriculum. This replaced the three hour elective.

23. 1935-1936 Dynamics and Mechanics of Fluids were reduced from five to three hours.

24. 1938 the course in Unit Operations Lab was added in the summer term between third and fourth year. This course lasted five weeks of lab on the campus six days a week and at least eight hours per day, but sometimes it lasted as high as twenty.

25. 1943-44 four hours of Unit Operations replaced Mechanical Engineering Lab in the fall quarter. Additional four hours of Unit Operations in the winter quarter replaced the electives.

ADDITIONS AND CHANGES IN THE CHEMICAL ENGINEERING CURRICULA 1903-1969 (Continued)

26. In 1946 the five-year program was adopted. The first two years were devoted to the pre-engineering division and the last three years to the professional division.

    In the five-year program a unique opportunity is provided by this plan for the superior student to pursue an honors program and to qualify for the Master's degree as well as the Bachelor's degree in approximately a three year period after admission to the Professional Division. Students who have shown early promise for success in graduate work and who are interested in following a research-oriented, engineering-science type curriculum are encouraged to apply for admission to the Combined Program. A student admitted to the Combined Program is registered currently in both the College of Engineering and the Graduate School in the third professional year and in this period a typical graduate program is individually planned under the guidance of a graduate adviser. When the student has satisfied all the requirements for either degree, he may receive that degree.

27. June, 1969 the five year program was abolished for a four year program. This was to keep in line with the other state universities which require only four years.

THE TEACHING STAFF IN CHEMICAL ENGINEERING - 1969

The names, field of specialty, the name of the schools attended, and the year joining the staff are given below:

1. Aldrich Syverson, Chairman and Professor: Kinetics of Adsorption of Gases on Solid Catalysis, Chemical Engineering, Economy, Electro Chemical Engineering, Plant Design, Polymer Engineering. B.Ch.E.-1938, Ph.D.-1942 (Minnesota). First appointed to this staff in 1950.

2. Joseph H. Koffolt, Professor: Unit Operations, Extractive and Azeotropic Distillation, Evaporation, Crystallization, Stoichiometry, B.Ch.E.-1924, M.Sc.-1929, Ph.D.-1931 (Ohio State). First appointed to this staff in 1928.

3. Robert S. Brodkey, Professor: Transport Phenomena, Fluid Dynamics Turbulence and Mixing, Rheology, Fluidization, and Two Phase Flow. Associate of Arts-1948, B.A. (Chem.)-1950, M.Sc.-1950, Ph.D.-1952 (San Francisco and Wisconsin). First appointed to this staff in 1957.

4. Edward J. Freeh, Professor: Mathematical Modeling, Process Analysis and Simulating Process Control. B.Ch.E.-1948, M.S.-1950, Ph.D.-1958 (Dayton, M.I.T., Ohio State). First appointed to this staff in 1968.

5. Christie J. Geankoplis, Professor: Transport Phenomena, Mass Transfer in Solid-Liquid or Liquid Systems, Phase Equilibria, Liquid-Liquid Extraction, Mass Transfer of Gases in Knudsen and Molecular Regions. B.Ch.E.-1943, M.S.-1946, Ph.D.-1949 (Minnesota and Pennsylvania). First Appointed to this staff in 1949.

6. Edwin R. Haering, Assistant Professor: Stoichiometry, Unit Operations, Kinetics, Plant Design, Process Development. B.Ch.E., M.Sc.-1956, Ph.D.-1966 (Ohio State). First appointed to this staff in 1959.

7. Harry C. Hershey, Assistant Professor: Transport Phenomena, Process Development, Design, Fluid Mechanics, Mathematical Modeling, Applied Chemical Engineering Mathematics. B.S.-1960, M.Sc.-1963, Ph.D.-1965 (University of Missouri at Rolla). First Appointed to this staff in 1965.

8. Webster B. Kay, Professor: Chemical Engineering Thermo Dynamics, Phase Behavior in Critical Region, Pressure-Temperature-Composition, Phase Relations that Form Azeotropes. B.Ch.E.-1922, Ph.D.-1926 (Ohio State and Chicago). First Appointed to this staff in 1947.

9. Ralph Emerson Lynn, Jr. (ALCOA Associate Professor): High Polymer Engineering, Process Development, Thermodynamic Properties of Compounds, Monomer Synthesis. B.Ch.E.-1942, M.Sc.-1949, Ph.D.-1952 (Purdue and Texas). First appointed to this staff in 1967.

10. Waldron D. Sheets, Associate Professor: Industrial Waste Water Research, Detergent Degradation, Color Removal in Paper Mill and Other Wastes. B.Ch.E.-1931, M.Sc.-1932, Ch.E.-1940 (Ohio State). First appointed to this staff in 1949.

THE TEACHING STAFF IN CHEMICAL ENGINEERING - 1969 (Continued)

11. Hartzel C. Slider, Associate Professor, Petroleum Engineering: Reservoir Engineering, Water Flooding Behavior, Petroleum Production, Pressure Build-up Analysis, Miscible Displacement Characteristics. B.E.M. (Pet. Eng.)-1949, M.Sc.-1949 (Ohio State). First appointed to this staff in 1955.

12. Edwin E. Smith, Professor: Refining, Testing and Analysis of High Molecular Weight Hydrocarbons, Reaction Mechanics Studies, Unit Operations, Stoichiometry, Transport Phenomena. B.Ch.E.-1944, M.Sc.-1947, Ph.D.-1949 (Ohio State). First appointed to this staff in 1949.

13. Karlis Svanks, Assistant Professor: Coal, Water Treatment, Adsorption. B.Ch.E.-1935, M.Sc.-1946, Ph.D.-1966 (Latvia, Vienna, Munich, Ohio State). First appointed to this staff in 1966.

14. Thomas L. Sweeney, Associate Professor: Transport Phenomena, Heat and Mass Transfer, Air Pollution Mitigation, Small Particle Systems. B.S.-1958, M.S.-1960, Ph.D.-1962 (Case Institute of Technology). First appointed to this staff in 1963.

15. Robert L. Bates, Adjunct Professor, President, Chemineer. First appointed to this staff part time in 1964.

16. John S. Eckert, Adjunct Professor, Director of Engineering, Norton Company, Chemical Process Control Division. First appointed to this staff in 1964.

17. John B. Martin, Adjunct Professor, Procter and Gamble, Manager, Research and Development, Cincinnati, Ohio. First appointed to this staff in 1964.

18. Alexis W. Lemmon, Jr., Adjunct Professor, Assistant Chief, Battelle Memorial Institute. Assistant Professor 1948-1952. First appointed present position in 1952.

19. Aleksander Kreglewski, Visiting Associate Professor - Thermodynamics. First appointed to this staff in June 1968.

DECEASED STAFF MEMBERS IN CHEMICAL ENGINEERING

1. Albert N. Vilbrandt, Assistant Professor, first appointed to the staff in 1919, died June 13, 1935.

2. Charles R. Owens, Instructor in Chemical Engineering, died June 15, 1940.

3. Thomas R. Kerr, Ameritas Associate Professor of Chemical Engineering, B.S. and M.S. Mechanical Engineering, Carnegie Institute of Technology, Liquid and Dolid Fuels Research, died 1959.

4. Peter O. Krumin, Professor, Chemical Engineering, Coal and Shale Oil, B.Ch.E. 1930, M.Sc. (Ch.E.) Doctor of Engineering 1941 (Latvian University and U.M.R.R.A.), died October 26, 1964.

DECEASED STAFF MEMBERS IN CHEMICAL ENGINEERING (Continued)

5. Edward V. O'Rourke, Professor Ameritas, Petroleum Engineering, former acting chairman Petroleum Engineering, appointed to the staff of Mining and Petroleum Engineering in 1919, died December 1967.

6. Charles E. Dryden, Professor, Chemical Engineering, appointed to the staff October 1954, died September 1968.

7. James R. Withrow, Professor and Chairman of Chemical Engineering Department 1924 to 1948, Head of Industrial Chemistry and Chemical Engineering division of the Department of Chemistry 1906 to 1924, died October, 1954.

8. Albert H. Vilbrant, Instructor of Chemical Engineering 1919 to 1935, died June 13, 1935.

9. Frank C. Vilbrant, Assistant Professor Chemical Engineering 1920 to 1922, resigned to accept Head of Industrial Chemistry - University of North Carolina, later on Head of Department of Chemical Engineering - University of North Carolina, Professor of Chemical Engineering - Iowa State College, Head of Chemical Engineering - Virginia Polytechnic Institute 1935 to 1960, died January 1960.

10. Howard E. Fritz, Special Assistant of Industrial Chemistry and Chemical Engineering 1921 to 1924, later was Vice President in charge of research for B. F. Goodrich Company, Brecksville, Ohio, died June 5, 1959.

FORMER LIVING MEMBERS OF THE TEACHING STAFF

1. L. Kermit Herndon, President Lyman Pump Company, on the staff from 1937 to 1960, was a Professor at the time of his resignation.

2. Charles E. Lapple, Senior Scientist, Chemical Engineering Department, Stanford Research Institute, Menlo Park, California, Adjunct Professor 1950 to 1955.

3. Thomas E. Corrigan, Associate Professor Chemical Engineering 1959 to 1966, Process Engineer, Mobil Oil Company.

4. Charles G. Duncombe, retired Chairman of the Department of Chemical Engineering, University of Detroit, Detroit, Michigan, 1927 to 1931 Dr. Duncombe was an Instructor at Ohio State, 1931 to 1936 he was an Assistant Professor of Chemical Engineering at Ohio State.

5. Clyde Kearns, Associate Professor, Chemical Engineering, Ohio State University, 1957 to 1959.

6. Leland F. Roy, Professor of Chemical Engineering, University of Mississippi, Assistant Professor of Chemical Engineering at Ohio State from 1945 to 1946.

SALARY OFFERS

Listed below are the salary offers since 1949. It will be noted that only the high and low offers are given. In the files of the department is a list of offers for each man from 1953 to date. These will be given in detail in a more comprehensive history of the department, which is in preparation and will be completed by the latter part of 1969.

Years	B.Ch.E.		M.Sc.		Ph.D.	
	High	Low	High	Low	High	Low
1949 - 1950	325	250				
1950 - 1951	300	275	340	300		
1951 - 1952	450	281	525	339	560	475
1952 - 1953	300	275				
1953 - 1954	Average 395		Average 427			
1954 - 1955	450	325	550	400	700	550
1955 - 1956	455	418	550	425	700	575
1956 - 1957	510	415	560	475	720	655
1957 - 1958	667	485	620	510	1000	650
1958 - 1959	525	470	700	525	1000	725
1959 - 1960	630	440	620	535	800	725
1960 - 1961	660	515	630	575	950	820
1961 - 1962	700	565	700	590	700	635
1962 - 1963	635	565	730	600	1025	850
1963 - 1964	692	610	760	650	1050	835
1964 - 1965	685	645	835	666	1050	950
1965 - 1966	800	670	900	735	1175	950
1966 - 1967	825	715	975	850	1200	980
1967 - 1968	855	660	970	900	1300	1041
1968 - 1969	1000	850	1100	900	1355	1104

THE OHIO STATE UNIVERSITY
DEPARTMENT OF CHEMICAL ENGINEERING

July, 1969

SALARY OFFERS FOR 1968-1969

Underlined salary offer accepted.

BACHELOR OF CHEMICAL ENGINEERING (5 years)

No.	Invitations for Plant Trips	Salary Offers
1.	12	950, 900, 850, 850, 1000, 915, 880, 885, 835, 930 900
2.	5	900, 885, 835, 1166, 1000
3.	8	860, 900, 850, 895, 867, 883, 875, 850, 885
4.	2	890, 875
5.	5	855, 865, 875, 895, 860
6.	3	890, 860, 860
7.	4	1166, 825, 900, 1000
8.	4	940, 940, 970, 915
9.	5	900, 900, 890, 900, 900
10.	10	940, 900, 875, 870, 895, 866, 840, 920, 890, 795
11	1	925

COMBINED BACHELOR OF CHEMICAL ENGINEERING AND MASTER OF SCIENCE

No.	Invitations for Plant Trips	Salary Offers
1.	2	900, 1000
2.	10	1025, 1075, 1050, 1025, 1000, 1050, 1033, 1024, 1050, 1015
3.	8	1000, 1000, 1025, 1015, 1100, 1000, 1025, 1050
4.	1	1000
5.	5	910, 910, 950, 940, 915
6.	4	975, 1015, 1008, 1000
7.	10	990, 990, 1000, 975, 890, 990, 975, 1000, 1005, 1000
8.	3	1000, 995, 915

MASTER OF SCIENCE

No.	Invitations for Plant Trips	Salary Offers
1.	6	925, 955, 970, 970, 925, 955
2.	4	965, 975, 910, 935
3.	4	965, 975, 910, 935
4.	3	985, 950, 925
5.	6	950, 930, 950, 900, 929, 950
6.	9	1080, 950, 975, 1000, 983, 950, 1020, 1020, 985
7.	1	870
8.	15	933, 950, 900, 905, 950, 925, 925, 940, 960, 940, 975, 1000, 925, 950, 950
9.	1	Continuing for Ph.D. at Ohio State
10.	4	950, 915, 920, 925
11.	10	900, 970, 900, 900, 950, 900, 960, 900, 950, 970
12.	3	950, 915, 940

Page 2
SALARY OFFERS FOR 1968-1969 (continued)
July, 1969

DOCTOR OF PHILOSOPHY

No.	Invitations for Plant Trips	Salary Offers
1.	14	1225, 1280, 1200, 1225, 1233, 1104, 1225, 1230, 1280 1225, 1280, 1225, 1225, 1250
2.	10	1325, 1380, 1380, 1300, 1305, 1380, 1325, 1355, 1400, 1350
3.	10	1260, 1260, 1260, 1240, 1240, 1240, 1240, 1200, 1276, 1250
4.	5	1285, 1150, 1285, 1250, 1200
5.	10	1100, 1225, 1100, 1100, 1100, 1100, 1125, 1050, 1125, 1100
6.	3	1300, 1320, 1325
7.	2	1200, 1250
8.	1	1250
9.	11	1280, 1275, 1275, 1300, 1300, 1300, 1300, 1300, 1300 1290, 1200

SUMMER JOB OFFERS FOR SUMMER, 1969

FIFTH YEAR STUDENTS

1.	650, 710, 685, 675
2.	700

FOURTH YEAR STUDENTS

1.	600, 660
2.	735
3.	731
4.	600, 630
5.	700
6.	615
7.	675
8.	625
9.	731

THIRD YEAR STUDENTS

1.	615

Others have not reported

NUMBER OF DEGREES CONFERRED BY THE DEPARTMENT

The number of degrees conferred by the Chemical Engineering Department on a cumulative basis is given below and for five years periods are given below.

Year	B.Ch.E.	M.Sc.	Ch.E*	Ph.D.	Total
1906	2	0	0	0	2
1910	27	1	0	0	28
1915	102	8	0	0	110
1917	134	17	0	1	152
1920	182	27	1	4	214
1925	296	55	4	19	374
1930	375	81	5	28	489
1935	499	127	10	57	693
1940	691	203	25	72	991
1945	965	238	25	90	1,318
1950	1,196	398	27	116	1,737
1955	1,337	523	28	168	2,056
1960	1,453	615	28	189	2,285
1965	1,582	689	29	213	2,513
1969	1,694	769	29	245	2,737

*Degree abolished in 1963

BUDGET: INSTRUCTIONAL, BUILDING, EQUIPMENT, SUPPLIES AND OTHER ITEMS

The tables which follow give the expenditures for Equipment, Supplies, and other items. It will be noted that the expenditure for the Chemical Engineering building is given for the first time in 1957 because Chemical Engineering was housed in the Chemistry building, now Derby Hall, from 1899 to 1924. In 1925 the present McPherson Chemical Laboratory was completed, it was named at that time as the "New Chemistry Building." Upon Dr. McPherson's death, the name of the building was named after him. The new Chemical Engineering building was completed during the Summer of 1959. It has been occupied since that time.

The large increases of purchases was due to the increase of budget from the Engineering College, grant in aids from chemical and petroleum companies, and by generous contributions of alumni of chemical engineering.

YEAR	SALARIES INSTRUCTION	SALARIES OTHERS	SUPPLIES	EQUIPMENT
1925	$11,432.66	--	$448.19	$1,956.74
1926	10,900.00	--	774.03	8,490.77
1927	12,932.98	--	921.21	3,971.91
1928	13,365.99	1,050.00	1,121.41	976.88
1929	14,214.00	1,293.00	1,999.88	1,226.85
1930	14,441.66	1,200.00	1,950.31	509.71
1931	16,000.00	--	998.75	2,160.16
1932	13,656.00	1,200.00	1,512.30	3,980.23
1933	14,220.00	1,170.00	2,557.46	763.51
1934	12,816.00	1,000.00	2,119.10	631.00
1935	14,326.00	--	2,427.68	91.05
1936	15,186.00	1,000.00	924.16	294.63
1937	19,049.33	1,000.00	2,578.90	1,011.01
1938	21,267.33	1,000.00	2,966.52	3,323.20
1939	21,085.00	1,000.00	3,148.08	3,069.66
1940	22,079.00	1,006.00	2,741.60	2,220.94
1941	23,718.00	--	3,064.97	1,152.64
1942	22,446.00	1,020.00	2,758.04	205.62
1943	29,043.00	500.00	2,042.88	1,228.74
1944	29,048.03	1,317.00	2,529.11	1,122.40
1945	19,796.77	1,658.00	1,203.14	1,118.50
1946	19,675.00	1,364.00	944.08	5,579.99
1947	40,909.00	3,235.50	2,921.11	881.82
1948	55,888.00	8,133.76	7,383.57	5,069.95
1949	57,813.58	7,686.00	10,464.95	5,713.69
1950	51,303.00	9,270.00	7,988.90	3,739.53
1951	55,856.00	10,131.00	6,899.14	2,951.30

YEAR	SALARIES INSTRUCTION	SALARIES OTHERS	SUPPLIES	EQUIPMENT
1952	$55,293.50	$12,600.00	$4,949.77	$5,420.87
1953	54,578.68	14,472.00	7,392.64	6,620.76
1954	55,516.00	16,203.00	6,443.40	2,479.94
1955	61,242.00	18,150.00	10,396.69	11,034.97
1956	66,093.00	19,535.67	7,600.55	11,147.99
1957	90,545.00	23,300.00	8,489.80	8,484.76
1958	100,957.00	22,094.14	10,554.96	14,232.14
1959	103,573.29	35,244.44	11,808.20	16,115.72
1960	110,629.00	31,528.27	15,795.39	10,988.15
1961	114,222.00	36,848.66	16,077.93	8,617.26
1962	121,314.00	34,303.50	17,145.12	6,125.21
1963	133,557.00	31,670.80	14,559.69	38,369.00
1964	167,280.00	36,157.35	16,419.39	13,900.25
1965	167,822.40	40,144.00	15,228.63	13,403.67
1966	181,113.00	35,715.66	14,670.52	21,569.97
1967	192,911.50	36,010.40	13,002.01	39,675.42
1968	268,280.55*		8,760.41	23,473.29

*Total Amount for Salaries Instruction and Salaries Other

MISCELLANEOUS ITEMS

YEAR	BUILDING	TRAVEL	COMMUNICATION AND SHIPPING	PRINTING	MAINTENANCE	TOTAL EQUIPMENT VALUE
1925	--	$226.76	$101.81	--	$4.03	$1,956.74
1926	--	164.51	322.12	--	13.00	10,447.51
1927	--	421.85	661.39	51.50	16.50	32,027.67
1928	--	203.33	44.38	--	61.00	33,288.44
1929	--	174.20	56.63	--	7.04	49,751.82
1930	--	208.86	33.43	80.24	168.78	50,280.93
1931	--	309.38	77.59	84.05	145.84	52,517.83
1932	--	60.19	206.30	115.46	41.69	56,605.64
1933	--	--	76.31	58.55	37.75	57,423.03
1934	--	70.00	24.61	61.25	24.48	58,345.68
1935	--	45.00	29.28	59.50	--	58,744.90
1936	--	87.95	13.31	52.75	51.55	59,445.86
1937	--	115.05	36.35	60.20	247.00	60,609.46
1938	--	98.74	50.36	--	68.75	64,267.57
1939	--	125.00	62.28	60.70	155.44	68,624.39
1940	--	--	64.69	--	256.59	70,834.33
1941	--	--	39.50	60.30	85.65	71,993.72
1942	--	--	61.64	65.10	68.50	72,199.34
1943	--	--	48.71	12.00	17.70	72,039.31
1944	--	--	17.38	11.25	601.61	73,411.71
1945	--	--	29.91	--	43.45	74,833.96

MISCELLANEOUS ITEMS

YEAR	BUILDING	TRAVEL	COMMUNICATION AND SHIPPING	PRINTING	MAINTENANCE	TOTAL EQUIPMENT VALUE
1946	--	--	$60.78	--	--	$82,500.35
1947	--	--	19.50	12.15	251.60	83,668.14
1948	--	178.20	92.43	9.85	104.99	89,919.31
1949	--	302.45	58.06	166.75	360.15	100,608.99
1950	--	190.62	153.31	139.50	126.05	104,172.70
1951	--	139.86	184.29	217.30	708.56	103,187.55
1952	--	188.17	97.65	152.05	118.14	110,101.25
1953	--	261.13	71.47	122.52	16.04	116,783.50
1954	--	188.93	23.22	194.59	241.01	119,165.63
1955	--	186.95	78.43	197.69	307.41	129,366.60
1956	--	156.66	33.98	129.50	107.95	140,230.84
1957	23,296.53	1,645.52	86.87	264.79	270.67	151,811.94
1958	346,460.01	1,714.61	836.15	176.30	531.68	185,390.08
1959	1,794,743.68	2,333.25	891.63	843.99	1,931.66	206,715.59
1960	2,296,795.71	1,603.97	462.15	869.75	1,387.71	224,149.53
1961	2,327,636.97	1,048.59	156.46	348.39	1,970.84	233,573.16
1962	1,936,896.29	1,027.11	1,523.34	1,358.70	2,192.56	545,556.22
1963	1,937,291.91	1,820.54	2,190.42	750.40	1,893.44	582,951.10
1964	1,936,896.29	964.94	2,282.73	340.61	2,666.39	592,086.19
1965	2,674,136.36	1,217.10	2,222.93	808.36	1,793.94	605,255.43
1966	1,936,896.29	1,558.69	3,304.80	2,694.05	3,471.28	636,540.62
1967	1,936,896.29	2,542.02	3,337.53	5,314.55	3,341.12	676,538.42
1968	1,945,852.29	2,574.29	3,773.91	4,285.42	3,490.39	788,215.69

DISTRIBUTION CHEMICAL ENGINEERING ALUMNI BY STATES

Alaska	3	Louisiana	28	Ohio	753
Alabama	12	Maine	3	Oklahoma	22
Arizona	8	Maryland	33	Oregon	3
Arkansas	1	Massachusetts	22	Pennsylvania	100
California	133	Michigan	99	Rhode Island	3
Colorado	12	Minnesota	6	South Carolina	15
Connecticut	28	Mississippi	6	South Dakota	1
Delaware	48	Missouri	21	Tennessee	23
Florida	40	Montana	3	Texas	99
Georgia	12	Nebraska	0	Utah	3
Hawaii	3	Nevada	1	Vermont	1
Idaho	1	New Hampshire	0	Virginia	40
Illinois	87	New Jersey	98	Washington	10
Indiana	64	New Mexico	7	Washington, D.C.	9
Iowa	2	New York	118	West Virginia	59
Kansas	10	North Carolina	9	Wisconsin	10
Kentucky	24	North Dakota	2	Wyoming	1

DISTRIBUTION CHEMICAL ENGINEERING ALUMNI BY FOREIGN COUNTRIES

Argentina	2	Finland	3	Taiwan	4
Australia	1	Formosa	5	Lebanon	1
Belgium	1	Germany	1	Malaya	1
Brazil	2	Greece	2	Mexico	2
British Hondurus	2	Holland	1	Peru	6
British West Indies	0	India	20	Philippines	3
Burma	1	Indonesia	1	Puerto Rico	4
Canada	6	Iran	2	Saudi Arabia	1
Chile	2	Iraq	4	Sicily	1
China	4	Iron Curtain	4	Sudan	1
Columbia	2	Israel	1	Switzerland	1
Egypt	1	Italy	1	Thailand	1
England	3	Japan	3	Venezuela	5
		Lybia	2		

OUTSTANDING GRADUATES.

The summary given below lists the recipients of honors from the University and the College of Engineering. There are several hundred alumni who have done outstanding work in the Chemical Industry. These men will be listed in the more comprehensive history which will give the names of Chemical Engineering Alumni classified by companies.

RECIPIENTS BENJAMIN G. LAMME MERITORIOUS ACHIEVEMENT MEDAL

1. Arno Charles Fieldner, Chief Fuel Technologist, U. S. Bureau of Mines, Washington, D. C., B.Sc. in Ch.E. 1906, Ch.E. 1923.
2. Albert Victor Bleininger, Ch.E. 1901.
3. Colonel George Arthur Burrell, Chief of Research Division Chemical Warfare Service, B.Ch.E. 1918.
4. Edgar Collins Bain, Vice President in charge of Research and Technology United States Steel Corporation, Pittsburgh, Pennsylvania, B.Ch.E. 1912, M.Sc. 1916.
5. Thomas Alvin Boyd, Consultant, General Motors Research Laboratories, Detroit, Michigan, B.Ch.E. 1918, Prof. 1938.
6. Harry C. Mougey, Technical Director, Research Division, General Motors Company, Detroit, Michigan, B.Ch.E. 1911, Prof. Ch.E. 1935.
7. Harry M. Williams, Vice President, Engineering and Research, National Cash Register Company, Dayton, Ohio, B.Ch.E. 1908, Prof. 1941.
8. Howard E. Fritz, Vice President Research, Goodrich Tire and Rubber Company, Brecksville, Ohio, B.Sc. 1913, M.Sc. 1914, Ch.E. 1923, Ph.D. 1924.
9. Melvin de Groote, Vice President, Tretolite Company, St. Louis, Missouri, B.Ch.E. 1915, Ch.E. 1942.
10. Ralph E. Hall, Director Hall Laboratories, B.Ch.E. 1911, Ch.E. Prof. 1939.

RECIPIENTS BENJAMIN G. LAMME MERITORIOUS ACHIEVEMENT MEDAL (Continued)

11. Mathew M. Braidech, Research Consultant, American Insurance Association, New York, New York, B.Ch.E. 1925, Ch.E. Prof. 1931.
12. Harry B. Warner, President, B. F. Goodrich Company, Akron, Ohio, B.Ch.E. 1938, M.Sc. 1939, Prof. Ch.E. 1947.
13. Parker S. Dunn, Vice President, Kerr McGee, Oklahoma City, Oklahoma, and President of its subsidiary American Potash and Chemical Corporation, Los Angeles, California, B. Ch.E. 1930.

RECIPIENTS THE "DISTINGUISHED ALUMNUS" AWARDS

1. William I. Burt, President and Chairman of the Board, Goodrich-Gulf Chemical Company, Cleveland, Ohio, B.Ch.E. 1917.
2. Samuel L. Shenefield, Superintendent, Parke, Davis and Company, Detroit, Michigan, B.Ch.E. 1918.
3. William H. Williams, Consultant, Dow Chemical Company, Midland, Michigan, B.Sc. 1919, Prof. Ch.E. 1941.
4. Hobart W. Seyler, Assistant Vice President, Coal Chemical Operations, U. S. Steel Corporation, Clairton, Pennsylvania, B.Ch.E. 1919, Prof. Ch.E. 1941.
5. Edward E. Slowter, Vice President, Secretary, Treasurer, Battelle Memorial Institute, Columbus, Ohio, B.Ch.E. 1934, M.Sc. 1935, Prof. Ch.E. 1939.
6. Alvin S. Stiles, Industrial and Biochemicals Department, DuPont Experimental Station, Wilmington, Delaware, B.Ch.E. 1931, M.Sc. 1933.
7. Edwin J. Corell, Consultant, Own Company, Cincinnati, Ohio, B.Ch.E. 1934.
8. Cyril R. Porthouse, President, Dunhill International Inc., Ravenna, Ohio, B.Ch.E. 1932, M.Sc. 1933.
9. Dr. Herbert L. Fenburr, Chief Engineer, Hanna Paint Mfg. Co., Columbus, Ohio, B.Ch.E. 1934, M.Sc. 1937, Ph.D. 1937.

RECIPIENTS THE "DISTINGUISHED ALUMNUS" AWARDS (Continued)

10. Herbert L. Barneby, Vice President, Barneby-Cheney Company, Columbus, Ohio, B.Ch.E. 1933.

11. Dean S. Hubbell, Vice President and Technical Director, H. H. Robertson Company, Pittsburgh, Pennsylvania, B.Ch.E. 1927, M.Sc. 1928.

RECIPIENTS TEXNIKOI OUTSTANDING ALUMNUS AWARD

1. Harry B. Warner, President, B. F. Goodrich Company, Akron, Ohio, B.Ch.E. 1947, M.Sc. 1939, Prof. 1947.
2. James Richard Farst, Plant Manager, Houston Chemical Corporation, Beaumont, Texas, B.Ch.E., M.Sc. 1956.
3. Robert L. Bates, President, Chemineer Inc., Dayton, Ohio, B.Ch.E. 1948, Ch.E. 1953.

HONORARY DOCTOR OF SCIENCE AWARDS

1. Harry Roger Drackett, President, Dracket Manufacturing Company, Cincinnati, Ohio, B.Sc. in Ch.E. 1907.
2. Arno Charles Fieldner, Chief Fuel Technologist, U.S. Bureau of Mines, Washington, D.C., B.Sc. in Ch.E. 1906, Ch.E. 1923.
3. Edgar Collins Bain, Vice President Research, United States Steel Corp., Pittsburgh, Pennsylvania, B.Ch.E. 1912, M.Sc. 1916.
4. Thomas Alvin Boyd, Consultant, General Motors Research Laboratories, Detroit, Michigan, B.Ch.E. 1918, Prof. 1938.
5. Melvin de Groote, Vice President, Tretolite Company, St. Louis, Missouri, B.Ch.E. 1915, Ch.E. 1942.

JOSEPH SULLIVANT MEDAL AWARDS

1. Arno C. Fieldner, Chief, Technological Branch and Chief Engineer, Coal Division, United States Bureau of Mines, Washington, D. C., B.Sc. in Ch.E. 1906, Ch.E. 1923.

LIST OF COMPANIES HAVING THREE OR MORE OHIO STATE UNIVERSITY CHEMICAL ENGINEERS LISTED IN ORDER OF NUMBER

The listing below is as of 1958. There have been several changes since then. For example American Potash Chemical Corporation (Now known as KerMac Potash Co., had two (2) Ohio State Chemical Engineers now there are ten (10). In 1958 there were two chemical engineers with Dow Corning now there are ten. This classification will be brought up to date in 1970.

NAME OF COMPANY	NO. OF OSU CHEMICAL ENGINEERS
E.I.DuPONT De NEMOURS AND CO.	106
UNION CARBIDE CORPORATION	72
UNIVERSITIES	55
B.F. GOODRICH COMPANY	46
GOODYEAR TIRE AND RUBBER CO.	43
BATTELLE MEMORIAL INSTITUTE	38
COLUMBIA-SOUTHERN CHEMICAL CORP.	29
GENERAL ELECTRIC COMPANY	27
GENERAL MOTORS CORPORATION	26
OLIN MATHIESON CHEMICAL COMPANY	26
SHELL OIL COMPANY AND CHEMICAL	21
EASTMAN KODAK COMPANY	20
STANDARD OIL OF INDIANA	20
STANDARD OIL COMPANY OF NEW JERSEY	19
MONSANTO CHEMICAL COMPANY	19
DOW CHEMICAL COMPANY	18
ARMY	18
FIRESTONE TIRE AND RUBBER CO.	17
U. S. STEEL CORPORATION	16
FEDERAL GOVERNMENT	16
AMERICAN CYANAMID COMPANY	16
PROCTOR AND GAMBLE	16
ALLIED CHEMICAL AND DYE CORP.	15
KOPPERS COMPANY	15
MEAD CORPORATION	13
U.S.A.F. AIR RESEARCH AND DEV.	13
SOHIO OIL AND SOHIO CHEMICAL	13
DIAMOND ALKALI	12
SOCONY MOBIL AND SOCONY VACUUM OIL	12
REPUBLIC STEEL CORPORATION	11
NAVY	10
PARKE-DAVIS	10
TEACHERS, HIGH SCHOOL	10
ATOMIC ENERGY COMMISSION	9
STATE OF OHIO	9
WATER, SEWAGE AND MUNICIPAL	9
WYANDOTTE CHEMICALS	9
GENERAL TIRE AND RUBBER (AEROJET)	8
HOOKER ELECTROCHEMICAL COMPANY	8
INTERLAKE IRON CORPORATION	3
OHIO DEPARTMENT OF HEALTH	3
SINCLAIR OIL RESEARCH LABS.	3
TEXAS (OIL) COMPANY	3
THIOKOL CORPORATION	3

NAME OF COMPANY	NO. OF OSU CHEMICAL ENGINEERS
PHILLIPS PETROLEUM	8
INDUSTRIAL RAYON CORPORATION	7
NORTH AMERICAN AVIATION, INC.	7
OWENS CORNING FIBERGLAS	7
U. S. RUBBER	7
ARMCO STEEL CORPORATION	6
ETHYL CORPORATION	6
FOOD MACHINERY	6
GLIDDEN COMPANY	6
LUBRIZOL CORPORATION	6
NATIONAL LEAD	6
NATIONAL STARCH	6
NAVAL ORDNANCE TESTING STATION	6
OWENS ILLINOIS GLASS	6
PURE OIL COMPANY	6
UNION OIL OF CALIFORNIA	6
WEST VIRGINIA PULP AND PAPER	6
AIR FORCE	5
ATLANTIC REFINERY	5
CHEMSTRAND CORPORATION	5
DAYTON RUBBER COMPANY	5
HERCULES POWDER COMPANY	5
LIBBEY-OWENS-FORD GLASS CO.	5
SUN OIL COMPANY	5
U. S. Gypsum	5
ASHLAND OIL COMPANY	4
U. S. BUREAU OF MINES	4
GENERAL ANILINE AND FILM Co. (ANSCO)	4
W. R. GRACE COMPANY	4
HAGAN CORPORATION	4
NESTIES(Western Hemisphere Research)	6
SHERWIN WILLIAMS	4
AMERICAN OIL COMPANY	3
AMERICAN POTASH AND CHEMICAL	3
AMERICAN CAN COMPANY	3
BABCOCK-WILCOX	3
C. F. BRAUN COMPANY	3
CHAMPION PAPER AND FIBER	3
HARSHAW CHEMICAL COMPANY	3
OHIO OIL COMPANY	3
OHIO INSPECTION BUREAU	3
SYLVANIA ELECTRIC PRODUCTS	3
TIMKEN ROLLER BEARING	3
WESTINGHOUSE ELECTRIC	3

SUMMARY OF OHIO STATE CHEMICAL ENGINEERING ALUMNI CLASSIFIED BY INDUSTRIES OR WORK FUNCTION

This was made in 1958. These data are given below. This classification is now in the process of bringing it up to date. This should be completed sometime in 1970. This 1958 classification took 90 pages, single spaced. It listed all of our alumni. There were 532 companies listed.

		NUMBER OF OSU CHEMICAL ENGINEERS	%
1.	Chemical Companies	600	36.48
2.	Petroleum, Petro-Chemicals, and Related Industries	177	10.76
3.	Rubber and Chemical Companies	143	8.69
4.	Teaching at Universities, High Schools, and Foreign Universities	85	5.17
5.	Federal Government (Army, Navy, Wright Field, Bureau of Mines, Bureau of Standards, etc.)	70	4.26
6.	The Metallurgical Industries, Coal-Coke Chemicals and Related Ind.	67	4.10
7.	Research Institutes	54	3.28
8.	Pulp, Paper, Containers and Related Industries	45	2.73
9.	Electrical Companies	42	2.55
10.	Paint, Lacquer, Pigment, Varnish and Related Industries	35	2.13
11.	Equipment and Instrument Companies	29	1.76
12.	Automotive and Related Industries	28	1.70
13.	Ceramic, Lime, and Construction Materials and Related Industries	27	1.64
14.	The Glass Industry and Related Industries	24	1.45
15.	Fire Underwriters, Inspection Bureaus, Insurance and Related Industries	23	1.40
16.	Food, Starch, Salt and other Agricultural and Related Products	22	1.34
17.	Pharmaceutical and Related Industries	22	1.34
18.	Aviation and Related Industries	22	1.34
19.	Miscellaneous Non-Chemical Companies as Stoves, Shoe Machinery, Cable, etc.	19	1.16
20.	Chemical Construction Companies	12	0.70
21.	Consulting Engineers, Technical Labs, and Own Business	11	0.67
22.	Water Sewage and Municipalities	10	0.61
23.	State of Ohio (Dept. of Health, Highway and Ind. Hygiene)	10	0.61
24.	Utilities (Gas, Electric, Power)	6	0.37
25.	Independent Patent Attorneys	3	0.18
26.	Technical Publications, (Chemical Abstracts, Engineering Alloys, etc.)	3	0.18
27.	Miscellaneous Non-Chemical Companies as Jewelry, Rugs, Real Estate, Grocery, Physicians, Finance Companies, Taverns, Motels, Gift Shops, etc.	56	3.40
	TOTAL	1645	100.00
	Deceased Alumni	116	
	Lost Alumni (No Address)	90	
	Lost Alumni (Possible Address)	41	
	Foreign Alumni (most of them in Communist China)	26	
	Grand Total	1918	

CHEMICAL ENGINEERING ALUMNI IN THE TEACHING PROFESSION

ACTIVE - U.S.A.

1. Alice Loyd College, Puppa Passes, Kentucky - Arilan R. Hershberger, Head of Chemistry Department

2. Bucknell University, Pennsylvania - George W. Minard, Professor

3. Illinois Institute of Technology - Robert C. Kintner, Professor

4. Indiana Institute of Technology - Ivan Planck, Chairman and Professor of Mechanical Engineering

5. Institute of Gas Technology - Joseph Parent, Educational Director and Supervisor

6. Kent State University - Merlin Corell, Instructor of Physics and Chemistry.

7. Louisiana State University - Arthur Choppin Dean, Chemistry and Physics

8. Michigan State University - M. H. Chetrick, Professor and Chairman

9. Michigan State University - B. W. Wilkinson, Assistant Professor

10. Michigan Technological University - J. Michael Skaates, Associate Professor

11. North Carolina State University - Chester O. Landes, Associate Professor Pulp and Paper Technology

12. North Carolina State University at Raleigh - Edward M. Schoenborn, Professor

13. North Carolina State University at Raleigh - Edward P. Stahel, Associate Professor

14. Ohio State University - Edward J. Freeh, Professor

15. Ohio State University - Webster B. Kay, Professor

16. Ohio State University - Joseph H. Koffolt, Professor

17. Ohio State University - Waldron Sheets, Associate Professor

18. Ohio State University - Edwin R. Haering, Assistant Professor

19. Ohio State University - Karlis Svanks, Assistant Professor

20. Ohio State University - Dean Reber, Assistant Instructor

21. Ohio State University - Robert L. Bates, Lecturer

22. Ohio State University - John Eckert, Lecturer

CHEMICAL ENGINEERING ALUMNI IN THE TEACHING PROFESSION

ACTIVE - U.S.A. (Continued)

23. Ohio State University - John Bruce Martin, Lecturer

24. Ohio State University - Alex W. Lemmon, Jr., Lecturer

25. Ohio State University - Hartzel C. Slider, Associate Professor Petroleum Engineering Division

26. Ohio State University - Clyde Kearns, Associate Professor Engineering Graphics

27. Ohio State University - Richard Hang, Professor Engineering Graphics

28. Ohio State University - Richard Parkinson, Professor Engineering Graphics

29. Ohio University - Robert L. Savage, Professor and Vice President of Research and Provost

30. Rutgers - The State University, New Jersey - Wolf R. Vieth, Professor and Chairman

31. Rutgers - The State University, New Jersey - Alkis Constantinides

32. Rutgers - The State University, New Jersey - John Koenig, Professor and Head of Ceramic Engineering

33. San Diego State College, California - Richard Fitz, Professor Mechanical Engineering

34. St. Bonaventure University, St. Bonaventure, New York - Brother Arnold (John E. Fargus)

35. State University of New York - Alfred, New York - Louis A. Weinland, Associate Professor Chemistry

36. Syracuse University, New York - S. Alexander Stern, Professor

37. The Cleveland State University - Patrick D. Culnan, Lecturer

38. The University of Tennessee - George C. Frazier, Jr., Associate Professor

39. The University of Tennessee - William H. Seaton, Lecturer

40. The University of Toledo - Charles E. Stoops, Jr., Associate Professor and Acting Chairman

41. The University of Toledo - James W. Lacksonen, Assistant Professor

42. Tulane University - Francis M. Taylor, Professor (Super. Div. Chem. Eng. Practice)

CHEMICAL ENGINEERING ALUMNI IN THE TEACHING PROFESSION

ACTIVE - U.S.A. (Continued)

43. University of Arizona - Donald H. White, Professor and Head of Chemical Engineering

44. University of Connecticut - Michael Cutlip, Assistant Professor

45. University of Dayton - Michael A. Bobal, Professor and Chairman

46. University of Delaware - Jack A. Gerstner, Professor and Chairman Chemical Engineering

47. University of Denver - Thomas D. Nevens, Associate Professor

48. University of Idaho - Richard E. Warner, Professor (Director, Eng. Exp. Sta.)

49. University of Illinois - T. J. Hanratty, Professor

50. University of Kansas - Dayle F. Bockhorst, Instructor, Mechanical Engr.

51. University of Maine - Richard E. Durst, Professor

52. University of Maryland, College Park, Maryland - Gaylord Estabrook, Professor of Physics

53. University of Mississippi - Leland F. Roy, Professor

54. University of Missouri - Rolla - Harvey H. Grice, Professor

55. University of Oklahoma - Kurt M. Dubowski, Professor Bio Chemistry and Toxicology

56. University of Southern California - Charles J. Rebert, Associate Professor

57. University of Southwestern Louisiana - W. K. Averitt, Associate Professor

58. Virginia Polytechnic Institute - S. B. Row, Director General Extension

59. Wayne State University - James H. McMicking, Associate Professor

60. West Virginia University - Howard P. Simons, Professor and Chairman

61. United States Air Force Academy - Major James S. Knox, Assistant Professor and Executive Officer - Department of Chemistry

62. United States Military Academy West Point New York - Lt. Col. Louis O. Elsaesser, Associate Professor Academy

63. Baltimore College of Commerce - Dr. Carl B. Marquand, Vice President for Academic Administration.

CHEMICAL ENGINEERING ALUMNI IN THE TEACHING PROFESSION

ACTIVE - U.S.A. (Continued)

64. Buena Vista College - F. L. Minnean, Chairman Division Natural Sciences

65. Bowling Green State University - Clare E. Martin, Head of Chemistry Department

66. Otterbein University - Lyle J. Michael, Professor Chemistry (Retired from Head).

Continued on Page

RETIRED ALUMNI

1. University of Detroit - Charles G. Duncombe, Head Chemical Engineering Department and Director of Research, Instructor of Science and Engineering

2. University of Tennessee - Calvin A. Buehler, Professor and Head, Chemistry Department

3. Indiana Technical College - Tod G. Dixon, Professor and Head

4. Virginia Polytechnic Institute - Robert A. Fisher, Associate Professor Chemical Engineering

5. Michigan Technological University - Henry Coles, Professor and Head of Department

6. Michigan Technological University - George Machwart, Professor Chemical Engineering

7. South Dakota School of Mines and Technology - G. G. Osterhof, Head, Department of Chemistry and Chemical Engineering.

8. Antioch College, Yellow Springs, Ohio - Wm. A. Hammond, Professor of Chemistry

9. University of Puerto Rico - Mayaguez Pena, Isidrio, Emeritus Professor

10. University of South Carolina - Thomas Wilson, Assistant Professor

11. The Ohio State University - Arthur M. Brant, Professor of Mineralogy

CHEMICAL ENGINEERING ALUMNI IN THE TEACHING PROFESSION

ACTIVE - U.S.A. (Continued)

67. Buffalo State College - Saul Barron (Ph.D. 1954), Professor Chemistry

68. Columbus Technical Institute, Columbus, Ohio - N. S. Gidwani, Chairman Department of Chemical Engr. Tech., Chairman Department of Instrumentation Tech.

69. Ohio State University - T. Krakowski, M.Sc.(Ch.E.) Ohio State University, Ph.D. University of California, Assistant Professor of Nuclear Engineering, Ohio State University

70. State Teachers College, Montclair, New Jersey - Rufus D. Reed, Chairman of Chemistry

71. University of Missouri-Rolla, Rolla, Missouri - B. R. Sarchet, Chairman Department of Engineering Management

CHEMICAL ENGINEERING ALUMNI TEACHING IN FOREIGN UNIVERSITIES

BRAZIL	1.	Carlos Guttman (M.Sc. expected 1969) Assistant Professor Federal University of Rio de Janeiro, Brazil
CHILE	2.	Rodrigo Donoso Haderra (Ph.D. 1964) Universidad Technica Frederico, Santa Maria, Chile
CHILE	3.	Kerrigan, Donald (M.Sc. 1958) University of Chile, Santiago, Chile
INDIA	4.	Don Wilhelm (Ph.D. 1964) Assistant Professor Ohio State stationed at the University of Kanpur, Kanpur, India
INDIA	5.	Mamata Dutta (Miss)(Ph.D. 1969) Assistant Professor, University of Kanpur, Kanpur, India
INDIA	6.	Boanerges B. Malvea (Deceased)(Ph.D. 1930) Principal, Ewing Christian College, Allahabad, India
INDIA	7.	K. S. Gandhi (M.Sc. 1965) Teaching Assistant, University of California. After Ph.D. - University of Kanpur, Kanpur, India (?)
INDONESIA	8.	Saswindi Sasmojo (Ph.D. 1969) Instructor Chemical Engr. Institute of Technology, Bandung, Indonesia
IRAN	9.	Parvis Jean Zibaee (B.Ch.E. 1967) Teaching Assistant, Aria Mehr University of Technology, Tehran, Iran
IRAQ	10.	M. O. Abdullah (M.Sc. 1952) Acting Chairman, Chemical Engineering Department, Baghdad, Iraq
JAMAICA BRITISH WEST INDIES	11.	Victor V. Elliott (w 1953) Dean of Probationers, Mica College, Jamaica, British West Indies
LEBANON	12.	Raja Hajjar (M.Sc. 1956 (Ch.E.) Ph.D. Chemistry, Beirut College for Women, Beirut, Lebanon
MALAYSIA	13.	Soon Ng (M.Sc. 1961, Ph.D. Chemistry - University of California) University of Malaya
Mexico	14.	Jorge Guzman (M.Sc. 1969) Assistant Professor, National University of Mexico, Mexico City
Peru	15.	Louis Talisa (B.Ch.E.) Professor Universidad Nacional de Ingeniera, Lima, Peru
PERU	16.	Juan Francisco Kuan (M.Sc. 1968) Associate Professor, Universidad Nacional de Ingeniera, Lima, Peru
PERU	17.	Benjamin Choy (M.Sc. 1969 Expected) Assistant Professor, Universidad Nacional de Ingeniera, Lima, Peru

CHEMICAL ENGINEERING ALUMNI TEACHING IN FOREIGN UNIVERSITIES

PERU	18.	Paul Fajardo (M.Sc. 1969 Expected) Assistant Professor Universidad Nacional de Ingeniera, Lima, Peru
PERU	19.	Edilberto Mogollon (M.Sc. 1969 Expected) Assistant Professor, Universidad Nacional de Ingeniera, Lima, Peru
PHILIPPINES	20.	Mrs. Luz A. Salonga (M.Sc. 1953) Assistant Professor University of Philippines
PHILIPPINES	21.	Cesar Banzon Bautista (M.Sc. 1959) Associate Professor, Adamson University
SUDAN	22.	Abd Hafeez (Ph.D. expected 1969) Professor, University of Khartoum, Khartoum, Sudan
THAILAND	23.	Phasook Kullavanijaya (Ph.D. 1966) Assistant Professor Chulalongkorn, Bangkok, Thailand
VENEZUELA	24.	Americo Larez (M.Sc. 1969 expected) Assistant Professor, Instituto Universidad Pto La Cruz Edo Anzoatepui Venezuela
CHINA	25.	Dr. Wen (Thomas) Liao (Ph.D. 1935) Professor of Chemical Engineering, National Chekiang University, Hang Chow, China

ALUMNI TEACHING OR HAVE TAUGHT IN CHINA AND ARE NOW BEHIND THE IRON CURTAIN

CHINA	1.	Toh Liu (Ph.D. 1926) Dean, College of Science, National Northwest University
CHINA	2.	Cho Wu - Department Chemical Engineering, Soochow University, Soochow, China
CHINA	3.	Chieh Ma (Ph.D. 1930) Teaching College of Chungking-China
CHINA	4.	Yi Ou-yang (Ph.D. 1933) Professor Chemistry, The Chung Chene Medical College, Nanchang Kiangsi, China
CHINA	5.	Wei Yang (Ph.D. 1930) University of Amoy, Amoy, China
CHINA*	6.	Shou-Chen Yang (Ph.D. 1932) Professor Agricultural Chemistry, Nan Tung University, Nan Tung, China

* Escaped to Taiwan in 1950.

ALUMNI TEACHING IN HIGH SCHOOLS

1. Main, H. V. (B.Ch.E. 1909) Teacher, Harrison High School, Chicago, Illinois
2. George, James E. (B.Ch.E. 1917) Director Industrial Education, Johnstown Public Schools, Pennsylvania
3. Mong, William L. (B.Ch.E. 1916) Teacher, Cleveland E. Tech., Cleveland, Ohio
4. Wolfe, Richard E. (B.Ch.E. 1922) Assistant Principal, Clyde High School, Clyde, Ohio
5. Fiske, Paul (w 1922) Principal, Sugar Creek School, Athens, Ohio
6. Gribbs, Ralph N. (B.Ch.E. 1930, M.Sc. 1932) Head Department of Science, Edison Tech. H. S., Rochester, New York
7. Fournier, Edward H. (B.Ch.E. 1930, M.Sc. 1933) Principal, High School, Portsmouth, Ohio
8. Schantz, Milton (M.Sc. 1931) Superintendent of Schools, Greenwich, Ohio
9. Hutt, T. M. (M.Sc. 1947) Teacher, Waterford High, McConnelsville, Ohio
10. Albrecht, Carl H. (Deceased)(M.Sc. 1933) Principal, Norwood High School, Norwood, Ohio

CHEMICAL ENGINEERING ALUMNI IN THE TEACHING PROFESSION

DECEASED ALUMNI

1. Karsten Andrew (Ph.D. 1922) Professor Chemical Engineering, South Dakota School of Mines

2. A. I. Andrews (Ph.D. 1924) Head, Department of Ceramic Engineering, University of Illinois

3. C. J. Black (Ph.D. 1931) Professor of Chemistry, Upper Iowa University

4. Wilson F. Brown (B.Ch.E. 1916 - Ph.D. 1928) Professor of Chemical Engineering, University of Florida

5. Dana J. Demorest (B.Ch.E. 1908) Chairman Department of Metallurgy, Ohio State University

6. Charles E. Dryden (Ch.E. Princeton University 1941 - Ph.D. Ohio State University 1951) Professor Chemical Engineering, Ohio State University

7. Paul Giesy (B.Ch.E.) Professor Chemistry, Newark College of Engineering

8. Paul M. Horton (B.Ch.E. 1918) Chairman and Professor Chemical Engineering, Louisiana State University

9. James O. Lord (B.Ch.E. 1915) Professor Metallurgy, The Ohio State University

10. Edwin M. Mann (B.Ch.E. 1918) Assistant Professor Rose Polytechnic Institute

11. Charles Owen, (B.Ch.E. 1927 and Ph.D. University of Michigan) Instructor, The Ohio State University

12. H. J. Ralston (M.Sc. 1919) Chairman Department Chemistry, Muskingum College

13. William C. Shank, Assistant Editor, Biological Abstracts, University of Pennsylvania, Philadelphia, Pennsylvania

14. Lawrence E. Stout (M.Sc. 1922) Dean and Professor Chemical Engineering

15. Orlando R. Sweeney (B.Ch.E. 1909) Chairman Chemical Engineering Department, Iowa State University

16. Albert H. Vilbrandt (M.A. 1921) Assistant Professor Chemical Engineering, The Ohio State University

17. Frank C. Vilbrandt (M.Sc. 1916) Head of Department of Chemical Engineering, Virginia Polytechnic Institute

NAMES OF BLACK GRADUATES WHO HAVE RECEIVED THEIR DEGREES IN CHEMICAL ENGINEERING

Harry Green - B.Ch.E. 1932, M.Sc. (Massachusetts Institute of Technology) 1938, Ph.D. Chemical Engineering June 1943 - O.S.U., Principal Engineer, General Dynamics and Electronics - a division of Stromberg Carlson
Best Address - 307 Greeley Street, Rochester, New York 14609

William D. Martin - B.S. (Wilberforce) 1933, M.Sc. Chemical Engineering 1934, Patent Examiner, United States Patent Office
Best Address - 514 Mark Road, Allendale, New Jersey 07401

William W. Grimes - B.Ch.E. 1950, Senior Technical Specialist, Standard Oil Company (Ohio)
Best Address - 30 Parmly Drive, Hudson, Ohio 44236

Charles Lane Benford - B.Ch.E. June 1955, M.Sc. December 1955, Chemical Engineer, Technical Center, Owens Illinois
Best Address - 3534 White Gate Road, Toledo, Ohio 43607

Mrs. Modupola Oluremilekun Kasin (Nie Owotoma) - B.Ch.E. December 1968, Housewife, going back to Nigeria after her husband receives his degree
Best Address - 293 E. 14th Avenue, Columbus, Ohio 43201

Jephthah Anozie Abara - B.Ch.E. June 1967, M.Sc. December 1967, Gulf Research and Development Company, Operating Research, Pittsburgh, Pennsylvania, a native of Nigeria and after training in the United States will join the Gulf Research in Nigeria, home - Owerri, East Nigeria
Best Address - 120 N. Homewood Avenue, Apt. 306, Pittsburgh, Pennsylvania 15208

Paul Alexander - B.Ch.E. 1956, 1966 - Chemical Engineer, Rocketdyne North American Aviation, Canoga Park, California
Best Address - 4101 Don Tomas Drive, Los Angeles, California 90008

Lieutenant Seward Mathews - B.Ch.E. June 1969, Process Engineer, Standard Oil of Ohio, he is now in the army as a Lieutenant
Best Address - 163 Williams Street, New London, Ohio 44851

NEGRO STUDENTS WHO DID NOT RECEIVE A DEGREE

Robert E. Smith - left 1933 as a senior student in Chemical Engineering, last address - Chief Engineer for Liberian Government at Monrova, Liberia, he only had 38 hours to complete for a degree but ran out of money
Best Address - we don't have one for him

Victor Elliot - dismissed from graduate school after a year, Dean of Probationers
Best Address - Mico College, Cross Roads P.O., Jamaica, British West Indies

CHEMICAL ENGINEERS IN THE ARMED SERVICES

World War I*

The genius and patriotism displayed by chemical engineers (and chemists) in the service of our country in the Chemical Warfare Service was not surpassed in any other branch of war work. The introduction of poison gases by the Germans in April 1915 marked a new era in modern warfare which called for immediate and drastic response both defensively and offensively. The War Department accepted the offer by The Bureau of Mines to cooperate in every possible way.

One of the first active participants in the development work in chemical warfare was Frank M. Dorsey (1908), chemical engineer with the Lamp Development Laboratory at Nela Park, Cleveland, Ohio.

The first big problem was the development of a defense against toxic gases. Mr. Dorsey (later Colonel Dorsey of the Chemical Warfare Service in charge of the Development Division) did much toward the development of the activated charcoal which helped to make the American gas mask the best on foreign battlefields. Colonel Dorsey was also technical director of the Offense Section of the Development Division for the large-scale manufacture of toxic gases.

The Research Division of the Chemical Warfare Service was placed under the direction of Dr. George A. Burrell (Chemical Engineer 1918) who soon had the cooperation of many of the best men of the universities and industrial plants of our country.

A central research laboratory was established at the American University in Washington D.C. Dr. Arno C. Fieldner (Major, C.W.S.) (1910) was in charge of the Gas Mask Research. Edgewood Arsenal in Maryland was established to augment the production of toxic gases and to expedite the filling of shells with the gases. Major Dana J. Demorest (1907) was in charge of Chemical plants Division at Edgewood. Dr. James R. Withrow rendered valuable service as a consultant in the work of the Chemical Warfare Service.

The enlisted personnel contained many chemical engineers from Ohio State University. In Major Fieldner's Division there were Fred Doutt (1920), Samuel Shenefield (1918), and Leonard Capell (1918), and Albert Vilbrandt (1918) in gas mask research, Paul M. Horton (1988) in smoke research.

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* Written by Leonard T. Capell, B.Ch.E. 1918, Ph.D. 1925, Director of Nomenclature and Executive Consultant, Chemical Abstracts Service

There were others who participated. For example, Mr. Stewart Keglee was assigned to the Mustard Gas Division and R. H. Schmidt to the Chlorine Plant.

WORLD WAR II

Chemical Engineers of Ohio State played an important part in World War II. One of the American war time achievements in Chemical Engineering was the synthetic rubber program. The four major rubber companies were headed up by Ohio State Chemical Engineers with William I. Burt at the B. F. Goodrich Company, Ernest Handley at the Firestone Tire and Rubber Company, George Lyon at the Goodyear Tire and Rubber Company, and John Caskey at U. S. Rubber Company.

William I. Burt was appointed to a key position in the synthetic rubber project as Chairman of the Standard Plant Design Committee. Under Burt's guidance, this committee took nebulous laboratory and pilot-plant data and evolved the basic design of the synthetic rubber plants in a matter of months. After more than ten years this basic design was still in operation with little or no change.

In 1943 the McGraw Hill Publishing Company presented an award for chemical engineering achievements to the synthetic rubber industry. William I. Burt was selected to receive this award on behalf of the industry.

During the war, plants were built to produce 705,000 tons of synthetic rubber annually. William I. Burt personally directed the construction of 255,000 tons.

In addition to synthetic rubber, Ohio State Chemical Engineers were active in producing toulene, benzene, and other organic products.

THE ARMY SPECIALIZED TRAINING PROGRAM (ASTP)

Ohio State was chosen among a few other Universities to give courses in this ASTP Program. There were some 55 men in uniform who were students at other universities. After a period of about five months they were assigned to other projects mostly the atomic nuclear engineering program. Later on this school for chemical engineering was cancelled at all other universities with the exception of Ohio State. The Chemical Engineering Department trained over 900 men in uniform for this project.

After the war many of these men decided to finish up their work at Ohio State rather than their original Alma Mater.

THE AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

The Department of Chemical Engineering was one of the first ten schools accredited by the American Institute of Chemical Engineers in 1925. Both the alumni and the students were and are very active in this society. The following alumni have held national offices in the American Institute of Chemical Engineers.

C. R. DeLong (B.Ch.E. 1914) was treasurer from 1936-1963. William I. Burt (1917) held the offices of national director, vice president, and president.

The following other alumni have been national directors of the American Institute of Chemical Engineers.

James R. Withrow (1913-1915; 1917-1919; 1928-1930)	Harry B. Warner (1962-1964)
Joseph H. Koffolt (1958-1960)	Bruce J. Martin (1968-1970)
E. M. Schoenborn (1964-1966)	Frank C. Croxton (1966-1968)

AWARDS

Joseph H. Koffolt was the recipient of the Founder's Award of the American Institute of Chemical Engineers. This award is given to recognized outstanding contributions in the field of Chemical Engineering.

Joseph H. Koffolt was also recipient of the Warren K. Lewis Award in 1969. This award sponsored by Esso Research and Engineering Company and Humble Oil and Refining Company recognizes a distinguished educator in Chemical Engineering.

OTHER AWARDS - COLUMBUS TECHNICAL COUNCIL

The Columbus Technical Council is made up of over twenty five technical societies in the Central Ohio Area. Each year a member of one of these societies is awarded the title "Technical Man of the Year." The following Ohio State alumni have been awarded this title: Edward E. Slowter (B.Ch.E. 1934; M.Sc. 1935; Ch.E. 1939) Vice President Battelle Memorial Institute, Dale B. Baker (B.Ch.E. 1942; M.Sc. 1948) Director Chemical Abstracts Service, Joseph H. Koffolt (B.Ch.E. 1924; M.Sc. 1929; Ph.D. 1931) Professor, Chemical Engineering. Former chairman Chemical Engineering Department (1948-1968)

ANNUAL AND NATIONAL MEETINGS OF THE AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

1935 - Dr. James R. Withrow was chairman of the local committee on arrangements for the 28th annual meeting of the American Institute of Chemical Engineers. Joseph H. Koffolt was Secretary of the local committee. Others from the department were Dr. Charles C. Duncombe, who was Chairman of th Technical Sessions Committee, and Dr. James O. Pence, Chairman of the Registration Committee.

December 3, 1950 - Joseph H. Koffolt was co-chairman of the local committee on arrangements for the 43rd annual meeting of the A.I.Ch.E. Dr. Syverson was a member of the Technical Program Committee. Dr. Kay was co-chairman of this committee. Dr. C. E. Dryden was Chairman of the Public Relations Committee, and E. E. Slowter was Chairman of the Entertainment Committee. Alex Lemmon was also a member of this committee.

May 15, 1966 - 59th Annual Meeting. J. H. Koffolt was Honorary Chairman of this committee. Lew Hullinger (B.Ch.E. 1947) was Co-chairman. Dr. E. E. Smith was Treasurer. Dr. T. Sweeney was Vice Chairman of the Finance Committee. F. D. Peterseim (1942) was Chairman of the Entertainment Committee. Dean Culnan, Jr. was a member of the Registration

Committee. H. L. Barneby was Chairman and Keith Jacobs was Vice Chairman. Drs. Brodkey, Kay, and Syverson were members of the Technical Program Committee. Dr. Syverson was Chairman of the Student Chapter Meeting.

OHIO STATE STUDENT CHAPTER AMERICAN INSTITUTE OF CHEMICAL ENGINEERS

The Ohio State University was the eighth school to be granted a charter for a student chapter (1925). At the present time there are over 100 departments of chemical engineering in other Universities having student chapters.

For many years, the student chapter had the highest percentage of transfers from student member to associate member. Joseph H. Koffolt as vice chairman of the membership committee student chapter was able to have many other schools have one hundred percent transfer from student member to associate member. Members of the student chapter have been recipients of the National Student Contest Problem.

NATIONAL STUDENT CONTEST PROBLEM

1934 Scott Lyon - Second Place
1936 Paul A. Mills - Second Place
1937 George H. Sheets - Honorable Mention
1952 David George Stephen - Third Place
1957 Arthur Leo Carter - Honorable Mention
1966 Glen C. McKee - Second Place - A. E. Marshall Award
1966 Thomas E. Fitz - Third Place
1968 William Ferguson - Second Place - A. E. Marshall Award
1968 John Salladay - Honorable Mention

REGIONAL STUDENT CONFERENCE AIChE

1968 John Curran - First Place - Morning Session
1968 John Toussant - First Place - Afternoon Session

THE PHYSICAL PLANTS OF CHEMICAL ENGINEERING

1902 - October, 1924 Chemical Engineering was a Division of Chemistry, although the first degree was awarded to Samuel V. Peppel in 1899. The degree was called "B.S. in Chemistry from the Engineering College". The first mention of a course in Industrial Chemistry was in 1902. The 1903 bulletin was the first to list a curriculum in Chemical Engineering. Also listed for the first time, is a laboratory course in Industrial Chemistry (or Chemical Engineering).

Blue prints of the new Chemistry Building which is now Derby Hall, prepared in 1904, give the first mention of laboratory space for Industrial Chemistry. It consisted of one laboratory, 16 feet by 25 feet, or 400 square feet. This was expanded later by converting the store room in the basement to an Industrial Chemistry laboratory of 1250 square feet. There was one window in this laboratory which was so covered with dirt that it gave no light, and in addition to this the laboratory was close by to the heating system for the building. With the heat and no natural light, this laboratory was known for many years as

"THE BLACK HOLE OF CALCUTTA"

About 1910, a course in Technical Analysis was introduced in the curriculum. It was first given by Professor Foulk and later by Professor Withrow. This course was concerned with ASTM (American Society for Testing Materials) analysis, tar, gasoline lubricating oil testing and other technical analysis as saponification and Iodine Number, etc. This course and a thesis course resulted in sharing another laboratory with Chemistry and Pharmacy. These labs according to Dr. Withrow were under the responsibility of the College of Pharmacy.

This laboratory was used heretofore for Freshman Chemistry. This laboratory was 50 feet by 70 feet or 3,500 square feet. The total square feet for Chemical Engineering was approximately 5,150 square feet, part of which was shared with Chemistry and Pharmacy.

The equipment in this building consisted of a Shriver Filter Press, a centrifuge, Sweetland and Center Feed filter presses, and hand pumps which were used to pump slurry into the filter presses. All of these were purchased about 1908. A Hoffman-Ahlers still was purchased in about 1919 for converting 95% alcohol to absolute alcohol. Permission to do this was obtained from the U. S. Government. The still kettle of this unit is still in use in the Chemical Engineering Laboratories. The design of this still broke all laws of design.

In the early 1920's Dr. Howard E. Fritz, who was later Vice President in charge of Research, installed and operated for his dissertation a Tyler Vitreosil System for the study of hydrochloric acid manufacturing. This unit caused so much corrosion that it was abandoned for laboratory work.

CHEMICAL ENGINEERING IN THE NEW CHEMISTRY BUILDING NOW KNOWN AS MCPHERSON CHEMICAL LABORATORIES

As has been stated, the Chemical Engineering Department was formed by the action of the Board of Trustees, September 6, 1924. It was at this time the new Chemistry Building was being constructed. Chemical Engineering was allocated 18,000 square feet. This was supposed to be temporary. It was not until 1957 that Chemical Engineering had its new building. In 1925 Chemical Engineering moved into the new Chemistry Building, which was named after Dr. McPherson after his death in 1951.

The 18,000 square feet included the Unit Operations and Process Development Laboratories which totaled 6,000 square feet, the Furnacing, the Industrial Chemical Laboratories, and the twenty-one (21) Research Laboratories and offices. Dr. Withrow would not accept the terminology of Unit Operations. Although this term is used almost universally in this country and many foreign countries, Dr. Withrow preferred the word "Machinery Laboratory." A description of these laboratories is given in a paper by Joseph H. Koffolt and James R. Withrow - "New Chemical Engineering Machinery Laboratory at Ohio State University" News Edition, Industrial and Engineering Chemistry, Vol. 43, Page 401, October 20, 1935. A reprint of this paper is included in this History.

The Department of Chemical Engineering was also allocated space for the Departmental Office; namely, Rooms 119 and 120. These rooms were located on the first floor of the four story section of McPherson Chemical Laboratories and at the extreme south side of the building. Dr. Withrow refused to move his offices to this location as he wanted to be close to the laboratories of Chemical Engineering. Two of these rooms were used by Graduate Students as offices. A short time thereafter the College of Engineering took these rooms over for offices so sorely needed by them. The College of Engineering moved into Hitchcock Hall in 1967. Subsequently, Chemistry was allocated this space for Departmental Offices.

In the middle 1950's the old A.P.I. (American Petroleum Institute) laboratory, which was used by Dr. Boord for the preparation of pure hydrocarbons was transferred to Chemical Engineering. It added about 800 additional square feet to Chemical Engineering. This laboratory was used for Dr. Geankoplis' Mass Transfer Laboratory and J. H. Koffolt's work on dialysis. The A.P.I. laboratory was moved to the War Research Building.

In 1951 there was a violent explosion in the API lab killing one of the organic research chemists. This resulted in allocating to Chemical Engineering the API pure hydrocarbon research laboratories, and to the Department of Chemistry and the Laboratory Supply Store a Quonset hut for the storage of drums of highly combustible solvents, cylinders of bases, and other dangerous chemicals. The total area was about 1000 square feet. This helped considerably in reducing the fire and explosions hazards in the above laboratories.

THE NEED FOR A NEW CHEMICAL ENGINEERING BUILDING

In 1950 the laboratories of Chemical Engineering were virtually bulging at the seams. It was impossible to find space for new equipment in the laboratories. Expansion was at a standstill. The ECPD (Engineer's Council for Professional Development) in its 1948 Accreditation Report stated, "The space available for Chemical Engineering is inadequate to handle the number of students enrolled."

The dire needs of Chemical Engineering are best illustrated by an article in the Ohio State University Monthly, (Volume 45, No. 3, December, 1953, P. 10). This article pointed out the needs of the College of Engineering as reported by Dean Gordon B. Carson, who was then the Dean of the College of Engineering.

"The most critical of many critical spots in the college seems to be Chemical Engineering. A department that graduated 20 students in 1925, is now graduating as many as 148 in recent years; is doing that with less space than it had in 1925. Advances in chemical engineering in the past two decades involve new techniques, more elaborate equipment and a different type of instruction.

But Chemical Engineering is using most of the equipment the department first obtained in 1906 to 1910. (New equipment has also been added, of course.)

The few classrooms allocated to the department are clustered around the heating system in McPherson Chemical Laboratory. Room temperatures sometimes run to 110 degrees and classes have to be hastily changed to avoid the high temperatures. Dr. Joseph H. Koffolt, department chairman, reports that he has witnessed the heat turning the asphalt tile in Room 258 into a putty-like mass.

Ventilation is bad. In Room 154, the skylights must be opened even on the coldest winter days to avoid a room temperature that has gotten as high as 100 degrees. The open skylights create uncomfortable and unhealthy drafts.

Swinging doors in hallways adjacent to labs are a constant danger. One of the fears of faculty and administration is that the doors might knock down someone carrying a cylinder of hydrogen sulphide, a bottle of bromine or fuming nitric acid. It would be a major catastrophe if such an accident occurred when classes are being dismissed and hallways are filled with students.

A virtual powder keg is created by the storage of volatile solvents and dangerous chemicals. The materials are kept in a Quonset hut located in a congested area north of the Chemical Laboratory. Compressed gas cylinders, each a rocket in itself if one should go off, are kept in the Laboratory Supply Store next to the Chemical Building.

Among Chemical Engineering's dire needs: a separate, safe building, four stories high to permit installation of equipment where height is a factor; a large lecture room seating 100; three small lecture recitation rooms; 12 group conference and seminar rooms; an additional 10,000 square feet of office space; five times the amount of machine shop space now available (600 sq. ft.); adequate and safe storage facilities in a separate building; and about 50,000 square feet of laboratory space to care for process development; fluids and mechanics, thermodynamics, and research.

Dean Gordon B. Carson of the College of Engineering reports his other departments vary from "just getting by" to "almost as bad as chemical engineering."

PLANNING THE NEW CHEMICAL ENGINEERING BUILDING

In 1953 Dean Carson reorganized the building committee and took over the chairmanship of this committee which heretofore was held by various Department Chairmen in the College of Engineering. Dean Carson recognized that the plight of the Department of Chemical Engineering was the worst in the college and therefore made the building for Chemical Engineering the number one goal of the college. In the meantime, Dean Carson requested that the chairman of the Department, at that time J. H. Koffolt, should write to prominent alumni of Chemical Engineering to write to Vice President Taylor, who was also Business Manager. Letters were sent to the following men January 31, 1955 to enlist their aid in getting a new building:

Dr. Edgar C. Bain	Mr. Edwin J. Corell	Mr. Hobert W. Seyler
Dr. T. A. Boyd	Mr. Melvin DeGroote	Mr. Samuel L. Shenefield
Mr. Mathew M. Braidech	Dr. Arno C. Fieldner	Mr. Harry Warner
Mr. William I. Burt	Mr. Bernard Sarchet	

The letter which was sent to these men is given herewith.

"Dear Mr.

As you probably have been told, we are this year making an attempt to start the program rolling to obtain new building facilities for many of the poorly housed areas of the College of Engineering.

The College of Engineering Building Planning Committee has recommended to the University Administration that $5,000,000 be obtained from appropriations for additions and betterment this biennium for the needs of the College of Engineering in buildings and equipment.

Dr. J. B. Taylor, Vice President and Business Manager of the University, is doing his usual good job of attempting to convince the legislature of the needs of the University and to show them that part of this need is in the College of Engineering.

Dr. Taylor may need some support from illustrious Alumni of the College, and I think it would be a fine gesture if you would send a letter to him, with a copy to me, offering to write letters to whomever he might designate expressing your interest and your support in the project to get new Chemical Engineering facilities.

For example, some of you may remember certain pieces of equipment which were here when you were in school and which are still in use. You could reiterate this to Mr. Taylor in telling him how great the need is for the

Department of Chemical Engineering and in stating your willingness to bring this matter to the attention of anyone whom he might designate.

We do not wish to presume to speak for you but we hope that you will be our ardent supporters in the next few months when the University biennial appropriation is being considered in the "State House."

I have attached a few facts concerning our present quarters and the need which may be useful to you in framing your own letter of support to Mr. Taylor.

You may be certain we shall be most grateful for your efforts and that the students who come here in the years to follow will benefit markedly from what you may be able to do in supporting us at this time.

Sincerely yours,

Joseph H. Koffolt"

RE: Additional Facts for the Supporting Letter.

"Gentlemen:

I am happy to report that for the first time in the proposed building program for the College, Chemical Engineering is No. 1. It also has the highest priority with the University Administration. This would have been impossible without the whole hearted support of Dean Carson.

As indicated in the enclosed copy of my letter of January 28th to Dean Carson, we hope that you eleven will write Dr. Jacob Taylor, Vice President, on your company's stationary and give your official title. Sometime back Dean Carson requested that I give him a list of outstanding alumni of the some 2000 who have received their degrees in chemical engineering. There were some 200 names on the list. Therefore, this list of eleven represents screening in the sub-micron range."

"ENGINEERS COUNCIL FOR PROFESSIONAL DEVELOPMENT (E.C.P.D.) REPORT TO PRESIDENT HOWARD L. BEVIS.

All of the departments in the College of Engineering were inspected by a committee of about 12 of the Engineers Council for Professional Development last May. We are happy to report our Chemical Engineering has been reaccredited again for a five year period. However, the inspectors have made several pertinent comments which, if not taken care of in the near future, might jeopardize reaccreditation when the inspectors come back in 1959. The following are excerpts from their report which pertain to this issue.

"The Ohio State University is a complex organism and a careful consideration of its operations leads to the question; are the problems of engineering education adequately understood by the central administration? On the face of statistics, this appears doubtful although the present Dean of the College of Engineering is apparently fully cognizant of the situation and doing what he can to alleviate it."

"The most pressing need of the College of Engineering at present seems to be adequate housing. Except for the Department of Electrical Engineering, housing ranges from barely adequate to bad, and this is especially true for the mineral industry departments located in Lord Hall."

"For the past ten years, engineering has apparently not been receiving its proportionate share of funds for buildings, supplies, and equipment. This is evidenced by the fact that during this period, although engineering averaged 12.3% of the total enrollment in the University, the College only received 3% of building appropriations, 2.9% of supply funds, and 7.4% of equipment monies."

"These statistics suggest that a relatively larger support for Engineering is overdue, which opinion is emphasized by walking through the buildings and talking to members of the staff and engineering administration."

"Certainly a building program for the College of Engineering appears to be a must in the immediate future with more money for equipment a slightly less important item. Unless this is forthcoming, retrogression in staff and teaching may be anticipated."

"While the permanent staff in chemical engineering is of adequate size, stable, competent, and interested in both teaching and research, the physical facilities are just barely adequate for the present enrollment. It is anticipated that there will be an appreciable increase in enrollment in the next few years which would make the present facilities inadequate for expanded research activities and expanded laboratory instruction. Furthermore, the poor lighting and poor arrangement of the building can lead to unsafe conditions if constant safety precautions are not taken. Stenographic assistance is a minimum and shop facilities are inadequate. Unless prompt steps are taken to alleviate these conditions the work of the department is bound to suffer."

"The staff is to be commended for the excellent performance under unsatisfactory physical conditions."

From memory, the following universities have provided new facilities for chemical engineering in recent years: 1. University of Minnesota, 2. University of Wisconsin, 3. Northwestern University, 4. University of Illinois, 5. University of Delaware (the 2nd building since 1938), 6. Iowa State College, 7. Case Institute of Technology (ready to build its 2nd building in a period of about 12 years), 8. North Carolina State College, 9. Alabama Polytechnic Institute, 10. Illinois Institute of Technology, 11. University of Cincinnati, 12. Purdue University, 13. Columbia University, 14. West Virginia University, 15. University of Maryland, 16. Virginia Polytechnic Institute (2nd building since 1938), 17. University of Toronto, 18. University of Colorado, 19. Oregon State College, 20. Michigan School of Mines, 21. Cornell University, 22. University of Virginia, 23. Villanova University.

Along these lines it is interesting to note the total floor space allotted for chemical engineering in various Universities. (In some cases these figures are estimates from floor plans.)

Cornell University - 110,000 sq. ft.	Wisconsin - 38,500 sq. ft.
Illinois - 51,100 sq. ft.	Iowa State - 44,800 sq. ft.
North Carolina State - 33,900 sq. ft.	Univ. Minnesota - 25,000 sq. ft.
Northwestern - 33,000 sq. ft.	Purdue - 31,600 sq. ft.
Oregon State - 35,400 sq. ft.	Maryland - 31,100 sq. ft.
Virginia Polytechnic - 52,00 sq. ft.	Ohio State Univ. - 19,355 sq. ft.

Preliminary Planning of the Building

Although we did have at least 15 complete designs of buildings from 1925 to 1950, it was thought best to obtain first hand information and visit as many university and industrial laboratories as possible. Everyone was so cooperative. Visits were made to DuPont's Experimental Station; Union Carbide Chemicals; Gulf Oil Research Laboratories; Hercules Powder laboratories at Wilmington; Esso Research and Engineering; Columbia-Southern Chemical Corporation's new laboratories at Natrium; Chemstrand at Decatur, Alabama and Pensacola, Florida; Dow Chemical at Midland; Corn Products Refining Chemical Division at Argo; Procter and Gamble's Miami Valley R and D Laboratories at Cincinnati; Goodrich Chemicals; Koppers; American Potash and Chemical Corporation at Whittier, California; and many others whom we visited on inspection trips. All of these plants were very cooperative at the time of the visit and, also, by the correspondence which followed. Many furnished blue prints and write-ups of their laboratories.

The following chemical engineering laboratories of universities were visited: Wisconsin, Delaware, Northwestern, Illinois, North Carolina State, West Virginia, Cincinnati, Case Institute of Technology, and Cornell. Blue prints and in many cases specifications were obtained from Delaware, Oregon State and Case Institute of Technology. In addition to this, photographs and descriptions of their laboratories were obtained from the following schools; Purdue, Wisconsin, Case, Cornell, Iowa State, Northwestern, Illinois, Virginia Polytechnic Institute, Louisville, Michigan College of Mining and Technology, Minnesota, Maryland, Oregon and Villanova. With all this good advice and information we were now ready to go ahead with the actual plans.

As a staff and with meetings held nightly from 7:00 to 11:00 P.M. and over a period covering a month, we made an inventory of our present space, the number of staff members we have now, the adequacy of the present space, and what was wrong with our present set-up. We also decided that we should look into the future and list all the types of laboratories we would like to have and how many new staff members will be eventually necessary as the Department progressed. It was our thought, also that our staff including the research professors in the Engineering Experiment Station would eventually be increased from 13 to 18.

On August 28, 1956, Dr. Syverson who was in charge of the Department that summer, was requested to get the specifications for each room, together with class sizes, dimensions, sketches, equipment needed and other details. The purpose of this was to give the architect information for preliminary planning and lay out work. He was given 10 days to integrate all the material the staff did the past year, and to modify the preliminary plans, when necessary, to be in line with reduction of space as outlined in Table III. This resulted in a 132 page report and was known thereafter as the "Bible of the Building". It was a herculean job. Dr. Lillian Golub Griff, an instructor in our Department at that time, also Mrs. Jean Ody and Miss Joanna Dorf gave much assistance to Dr. Syverson.

Early in 1954 Vice-President Carson (then Dean) requested that we should prepare a book on "The Chemical Industry with Special Reference to The State of Ohio and Chemical Engineering Education at The Ohio State University". Four volumes of this 168-page book was prepared. The purpose of this was to inform the University Administration and other interested persons of the role that Ohio State Chemical Engineering was playing in the chemical industry of Ohio.

Jake Meckstroth, Editor and Vice-President of the Ohio State Journal, in several editorials pointed out the expanding need of the chemical industry in Ohio. In 1954 there were 54 major projects amounting to over $2,000,000,000.00. He also brought out the role of the Ohio State Chemical Engineer in this development and, also, the future needs. All of this together with Dean Carson backing us up to the limit resulted in the appropriation of $2,400,000.00 for Chemical Engineering and related fields.

The architectural firm of Small, Smith, Reeb, and Draz was commissioned in early 1956 to draw up the plans. They were awarded $86,000.00 for this. In early 1957, $2,400,000.00 was allocated for the new Chemical Engineering Building including laboratory and office furniture and equipment. The contract for constructing this building was awarded to Baker and Combs, Inc., Morgantown, West Virginia. They were the low bidder. The figure was $366,930.00 below the general contract. The Ohio State University Board of Trustees approved these plans September 3, 1957. Demolition of the temporary laboratories on the proposed site began December 1, 1957. Ground was broken January 16, 1958. It was hoped that the building would be ready for occupancy February 1, 1959, but due to many strikes the building was turned over to us June 1, 1959.

THE BOOK - LABORATORY PLANNING FOR CHEMISTRY AND CHEMICAL ENGINEERING

We were invited to contribute a chapter in the book Laboratory Planning. Dr. Syverson and J. H. Koffolt collaborated on this chapter (XIII, Pages 348-365). This book edited by Dean Harry F. Lewis of Paper Institute was published by Rinehold Publishing Company, New York City (Copyrighted 1962). In the appendix of this history is given the manuscript and floor plans of the Chemical Engineering Building.

THE ALUMNI AND INDUSTRY DRIVE FOR CONTRIBUTIONS TO THE CHEMICAL ENGINEERING EQUIPMENT DEVELOPMENT FUND

In the spring of 1958 Harry Warner, Vice President Technical B. F. Goodrich Chemical Company, accepted the appointment as chairman of the committee on alumni and industrial contact (in 1960 he was promoted to President of B. F. Goodrich Chemical Company and in 1964 President of B. F. Goodrich Company which included all divisions).

It was decided at this meeting that a pilot plant run would be made with Chemical Engineering as the model.

Even though Harry Warner's committee included all departments of the college, Chemical Engineering was chosen first as he knew more about this than the others and also because Chemical Engineering was the furthest along of all the buildings. As the work progressed, it was decided that each department that wished to have its drive for finances aid the purchase of up-to-date equipment should do so on its own. Harry Warner continued as Chairman of the Chemical Engineering drive in Cleveland, Monday, March 25, 1958. At this meeting the following were present: Harry Warner, Dean Robert C. Green, and J. H. Koffolt. After this meeting, Dr. Melvin DeGroote (Vice President of the Tetrolite Company of St. Louis), whose ambitions for many years were to participate actively in the raising of funds, joined the committee. John P. Smoots, Vice President (retired) Sohio Petroleum Company, also became a member of this committee.

In the spring of 1958 Gordon B. Carson, who was then Dean of the College of Engineering, requested Joseph H. Koffolt to prepare a list of all the alumni and where they were working. A single spaced, 85 page report resulted. It indicated that the alumni of Chemical Engineering worked in 532 companies. Page 24 of this history gives the names of the companies employing Ohio State Chemical Engineers. There were 532 companies and this list gives those companies that employ three or more Chemical Engineers.

Our file indicated that there were 134 Petroleum Engineers and 1,740 Chemical Engineers totaling 1,874. Taking into consideration the deceased alumni, those whose addresses were not known, and those who were not in a position to contribute, reduced the total to 1,515 Chemical and Petroleum Engineers.

The following pages give the letter which was sent to the Chemical Engineering alumni. Although it is a form letter, a personal note was written to each of the alumni. It took over 800 hours to write these personal notes.

THE OHIO STATE UNIVERSITY
NOVICE G. FAWCETT, *President*
COLUMBUS 10

COLLEGE OF ENGINEERING
DEPARTMENT OF CHEMICAL ENGINEERING
Divisions: CHEMICAL ENGINEERING
PETROLEUM ENGINEERING

I am so happy to report that soon the great movement will begin to the most beautiful and the best Chemical Engineering Building in the world. About April 1, 1959, we will finally begin to move out of our present temporary quarters which we first occupied in 1925 when our first migration was from the "Black Hole of Calcutta." Since that time, it has been 35 years of optimism, great expectations, and patience. By April 1, 1960, all of our activities will be in the building of buildings--Chemical Engineering. The week of the Annual Conference for Engineers, in May, 1960, will be the dedication. This will be culminated in what I hope will be the reunion of all classes at the 1960 Alumni Day.

The cost of the first phase of the structure, which will house all of Chemical Engineering, including our Division of Petroleum Engineering, and some of Metallurgical Engineering, will be approximately $2,400,000; of this, $370,000 is for laboratory, classroom, and office furnishings and services. Eventually, this building will be expanded to house Metallurgical, and Ceramic Engineering and Mineralogy.

But, and this is the dark cloud on the horizon of our bright future, we will need additional money for equipment. This is explained in detail in the enclosed brochure, which gives our status in regard to present equipment facilities. This brochure was prepared for distribution to the chemical industry to help obtain their support. It is true we do have some good equipment. This has been due to the recognition by some companies that support of chemical engineering education at The Ohio State University is necessary if they are to expect a continued excellent product from us. They have done much for us--there is more to do. We, in chemical engineering education, must keep pace with industry if we are to produce the product required by today's market--well-trained chemical engineers.

This letter is an appeal to all of our alumni to come to the aid of the department in providing research equipment so that our facilities will be second to none. The University and the State of Ohio have supported this department beyond our expectations. They have expressed their faith by giving us a chemical engineering building second to none.

Many of you have demonstrated your allegiance to the University and the department. Here are a few of the words of appreciation of our alumni for what Ohio State's Chemical Engineering Department has meant to them:

"Maybe I would be a 'pants presser' like my father if it were not for the opportunity of the very little cost of my education at Ohio State."

"Maybe I would be an auto mechanic if it were not for Ohio State - I owe everything to this great institution and especially to the Chemical Engineering Department which took such a personal interest in me. I was not another number."

"I was a farm boy - but the Department of Chemical Engineering at Ohio State gave me confidence to lick any problem. I am retiring very soon, but it is with happiness that I look back to my many good years, even though my career stems from the 'Black Hole of Calcutta.' What can I do to help in equipping the new building so that others in this fast changing world can be helped as I was helped?"

Each alumnus must decide for himself the extent of his once-in-a-lifetime pledge. At the present time, there are about 1500 known living alumni. It is hoped that the overall average will be about $100 per alumnus. Several have already given much without solicitation.

A card is enclosed for you to make a pledge. You will kindly note that you can spread this out however you see fit. The Development Fund Board of Directors has done us the honor of approving this project as a special solicitation as "OSU Development Fund Project 5650 - Department of Chemical Engineering." The contribution you make is deductible from your individual taxable income. The fund will send you its usual mailing hoping that you may also make a modest gift for general University good.

There will be a bronze plaque in the hallway at the entrance of the building naming those who have supported this campaign.

One final word about the extreme importance of your gift--we are going to solicit the chemical industry. Their first question will be: "How much have your alumni pledged?" When we tell them that the best judges of our educational output--you, yourselves--have placed a high value on that education by your pledges, we will have the most beautiful argument we can muster for getting substantial money from them.

With best wishes to all of you.

Most cordially yours,

Joseph H. Koffolt, Chairman
Department of Chemical Engineering

JHK:ch

THE OHIO STATE UNIVERSITY
NOVICE G. FAWCETT, *President*
COLUMBUS 10

COLLEGE OF ENGINEERING
DEPARTMENT OF CHEMICAL ENGINEERING
Divisions: CHEMICAL ENGINEERING
PETROLEUM ENGINEERING

Many of you were concerned about the objectives of the University in placing Petroleum Engineering in the Chemical Engineering Department. If, in some of your minds, this constituted a "dark cloud" you will be happy to know that we are now encountering the "silver lining" in the form of new facilities in the new Chemical Engineering Building.

The State of Ohio is providing us with a drilling fluid lab (640 sq. ft.), production lab (670 sq. ft.), reservoir engineering lab (850 sq. ft.), and an outside production lab (1200 sq. ft.), totaling 3360 sq. ft. In addition, we will share with Chemical Engineering eleven graduate labs, a phase lab, storage room, machine shop, shop storage, duplicating room, darkroom, conference room, seven computation rooms, glass blowing room, precision standards room, and drafting room totaling 12,260 sq. ft.

In working to improve our program, I have visited the Petroleum Engineering Departments at Penn State, Texas A and M, and Tulsa University. Our new Petroleum Engineering laboratory space will surpass all of these schools in quality and space per student. Space for graduate work also is ample. The one thing we still lack is sufficient laboratory equipment.

The State of Ohio is unable to supply us with the equipment we believe necessary for the new building. We greatly need equipment for pumping, gas lifting, and logging experiments. We are being supplied with the bare necessities for basic experiments in hydrocarbon PVT analysis. However, accurate work for research and condensate analysis will require an additional investment. These are only two examples of our equipment needs. The significant work that could be accomplished with this additional equipment should be obvious.

The cost of the first phase of the Chemical Engineering Building, which will house all of Chemical Engineering, Petroleum Engineering, and some of Metallurgical Engineering, will be about $2,400,000; therefore, lack of sufficient equipment funds at this time is understandable.

This letter is an appeal to all Petroleum Engineering alumni to come to our aid in providing equipment so that our facilities will be second to none. The University and the State of Ohio have supported Petroleum Engineering beyond our expectations. They have expressed their faith by giving us an engineering building second to none.

Each alumnus must decide for himself the extent of his once-in-a-lifetime pledge. At the present time, there are about 130 known living alumni. It is hoped that the overall average will be about $100 per alumnus.

A card is enclosed for you to make a pledge. You will note that you can spread this out however you see fit. The Development Fund Board of Directors has done us the honor of approving this project as a special solicitation as "OSU Development Fund Project 5650 - Department of Chemical Engineering." The contribution you make will be deductible from your individual taxable income. The Development Fund will send you its usual mailing, hoping that you may also make a modest gift for general University good.

There will be a bronze plaque in the hallway at the entrance of the building naming those who have supported this campaign.

One final word about the extreme importance of your gift--we are going to solicit the petroleum industry. Their first question will be: "How much have your alumni pledged?" When we tell them that the best judges of our educational output--you, yourselves--have placed a high value on that education by your pledges, we will have the most beautiful argument we can muster for getting substantial money from them.

Give us <u>your</u> support.

Sincerely,

H. C. Slider, Associate Professor
i/c Petroleum Engineering Division

Joseph H. Koffolt, Chairman
Department of Chemical Engineering

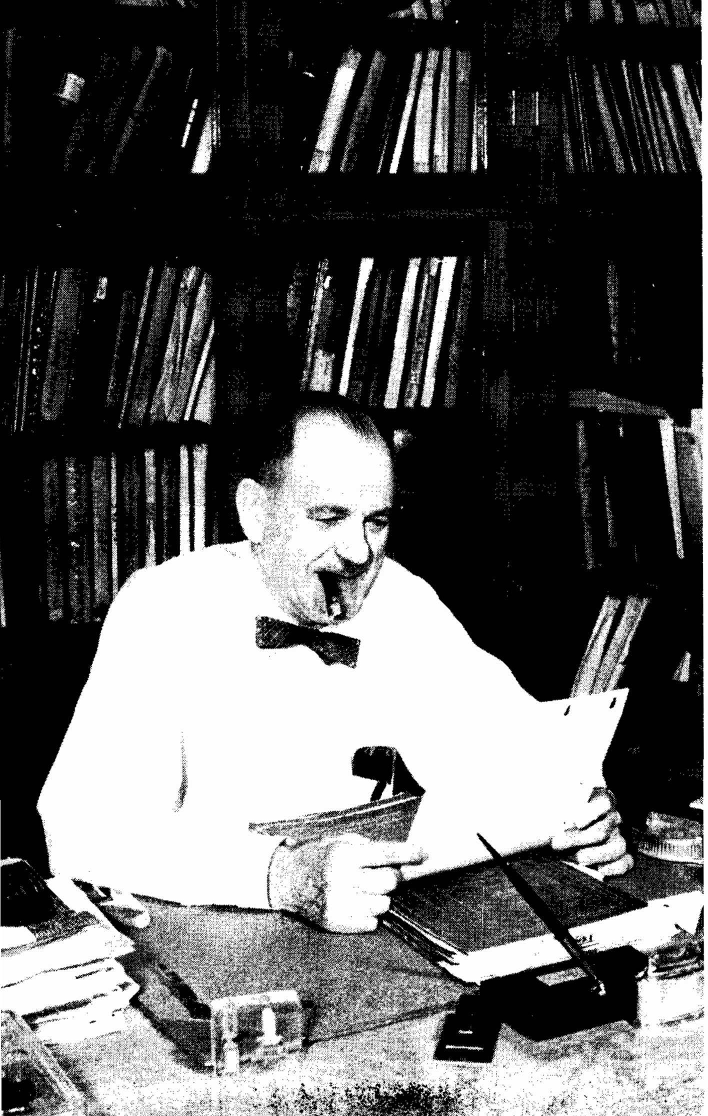
P.S. We are enclosing the brochure which will be used in soliciting the chemical and petroleum companies.

56

Chemical Engineering

at

The Ohio State University



To: The Chemical and Allied Industries

The June, 1959, commencement will mark a 53-year span of our Department of Chemical Engineering. During that time we have contributed 1986 graduates to a total of 540 companies, universities, and other organizations. 1959 will be the milestone year when we move into our new building--the best and most beautiful chemical engineering building in the world. We have waited for this event with great and patient expectation.

This modest brochure tells why we need support. The State of Ohio has allocated approximately $2,400,000 for the building, services, fixtures, and furniture. However, there is not, and will not be, money for adequate equipment. This will be needed if we are to continue to maintain the outstanding contributions to industry that we have made in the past half century. We, in chemical engineering education, must keep pace with the needs of industry if we are to produce the chemical engineering graduates required by industry.

This brochure is an appeal to industry to come to the aid of our Chemical Engineering Department in equipping this building.

We ask for an investment which will pay dividends for your company. This investment for the future will go far toward assuring a continuing supply of qualified engineers for the chemical industry.

Most cordially yours,

Joseph H Koffolt

Joseph H. Koffolt, Chairman
Department of Chemical Engineering

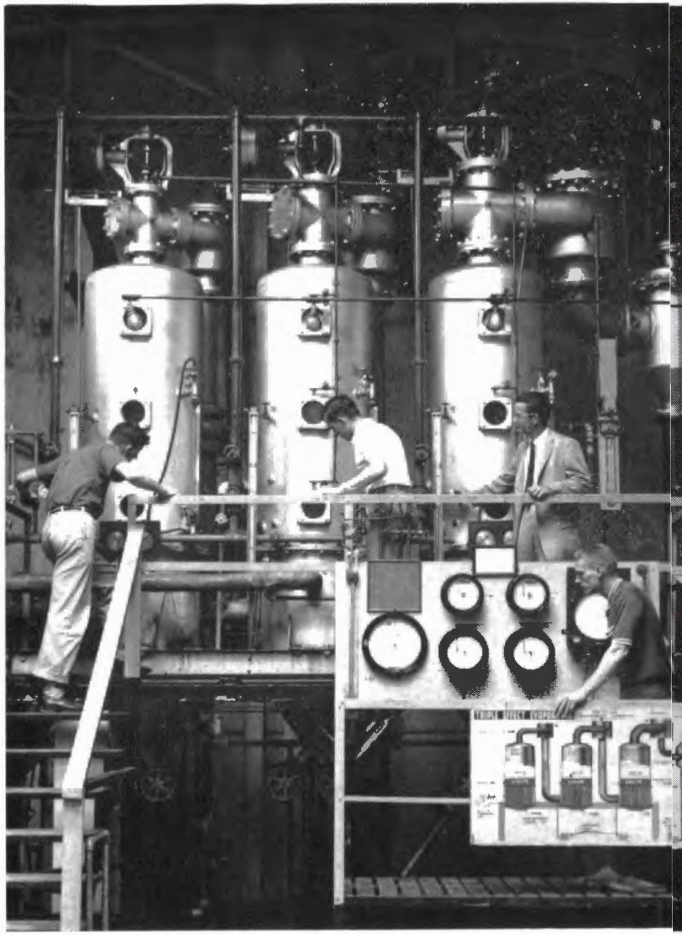
Training of Chemical Engineering Students

Over the past 25 years Ohio State has graduated 1,500 Chemical Engineers, and all indications are that during the next quarter century 3,000 more will be graduated with bachelors, masters, or doctors degrees in Chemical and Petroleum Engineering at Ohio State.

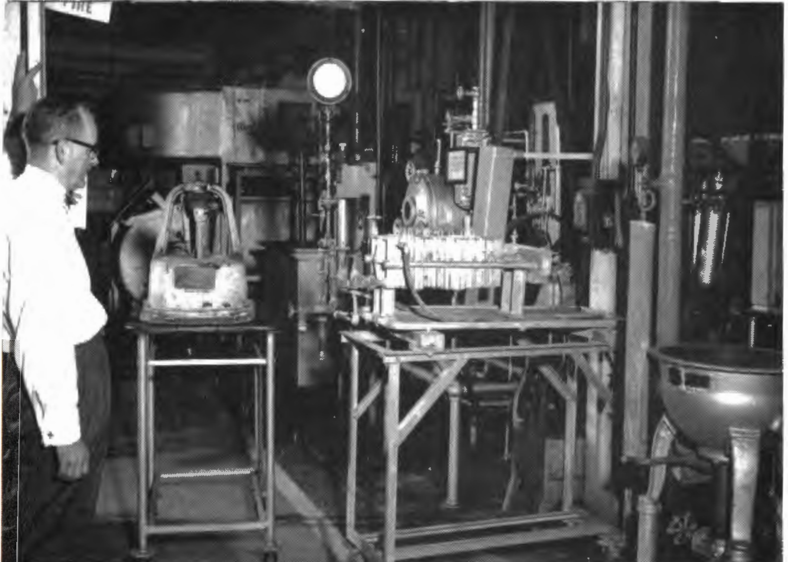
These graduates are highly trained persons and will have received from five years (for the bacehlors) to eight years or more (for the Ph.D.) in training for their professions.

Approximate calculations indicate that the cost of training a five-year graduate is about $6,700, of which the Bachelor Degree holder pays only $1,200 to $1,400. Using the same calculations, the cost of training graduate students is about $7,700. These more highly trained persons pay an additional $400 to $900, depending on the time spent in course work and research.

Obviously, the degree of training required to produce high-quality graduates requires the best in faculty and equipment and much more space and equipment than needed to train graduates in many other fields.



Professor Clyde Kearns (top, right) with three students and the 25-year-old Triple Effect Evaporator. This equipment, still in good condition, will be moved to the new Chemical Engineering Building.



These two pictures point out the age contrast in equipment, the old and the new. The filter press and steam jacketed kettle shown in the top photo date from 1907 and 1910.

The analog computer in the bottom photo with Ed Freeh was only recently assembled in the department.

One in Thirty-Four

Needless to say, Chemical Engineering and the training of Chemical Engineers have changed over the years. Joe Koffolt's description of the changes is that "We have emerged from industrial or wash-tub chemistry to Chemical Engineering."

On the cover of this brochure is the architect's rendering of the new Chemical Engineering Building, now under construction. This is the curtain-raiser on a $12-million building program proposed by the College of Engineering. The $5-million worth now under construction includes the new Chemical Engineering Building.

This new building marks the SECOND engineering building undertaken since 1924 (Electrical Engineering building was built in 1949). You will note on the back cover a picture of the proposed Engineering Center indicating existing buildings, those under construction, and those proposed. Chemical Engineering marks the beginning of what is hoped to be a realization of the present-day needs.

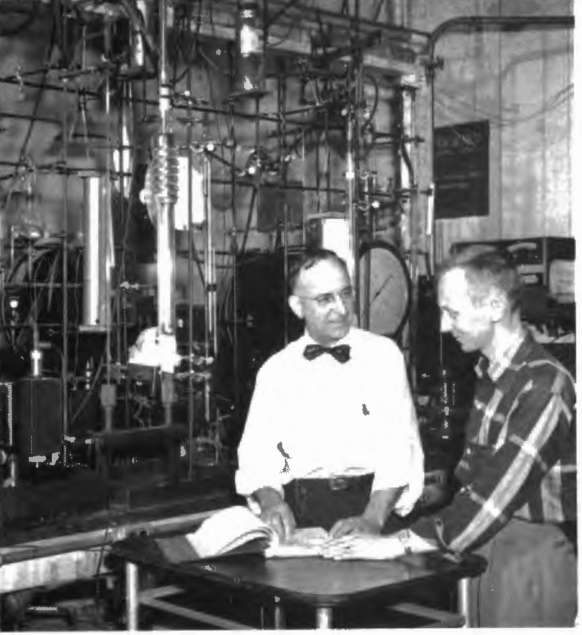
$1-Million in Equipment Needed

No department in the College of Engineering needs additional equipment more than the Department of Chemical Engineering. $1-million is needed to equip the new building as it should be for modern training.

The present equipment, much of it of ancient vintage but much in good condition and usable, is valued at about $180,000. At the right (top) is a picture of one of the two 33-year-old wooden tanks which developed leaks and had to be removed and junked. There are still two remaining. On page three is shown the 25-year-old evaporator; and on page four the ancient filter press, steam jacketed kettle, centrifuge, etc. But more up-to-date equipment such as the analog computer is needed.

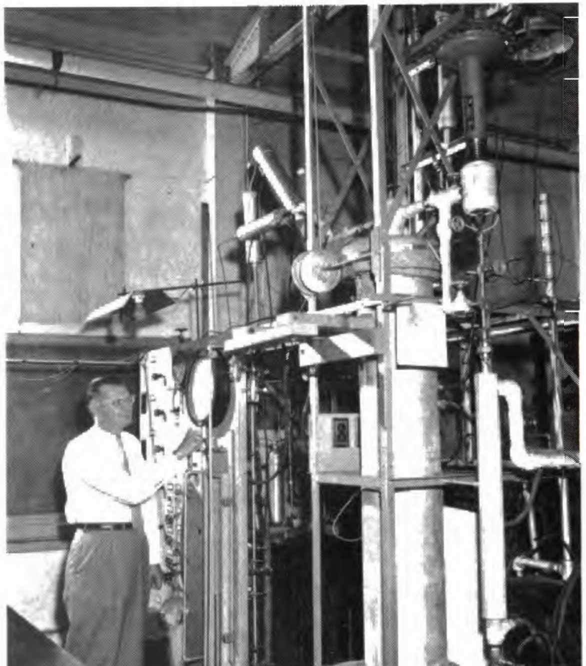
Much of the old equipment would be anachronistic in the new, modern Chemical Engineering Building. Much of the old equipment is valueless; some of it is still useful. During the past 25 years when Ohio State was training 1,500 Chemical Engineers the State contributed about $140,000 toward equipment—about $100 per graduate. But, do we not need more?

Professor Robert S. Brodkey (bottom photo) works in the areas of nature of momentum and heat and mass transfer. Such research requires extensive facilities if expansion is to be expected.

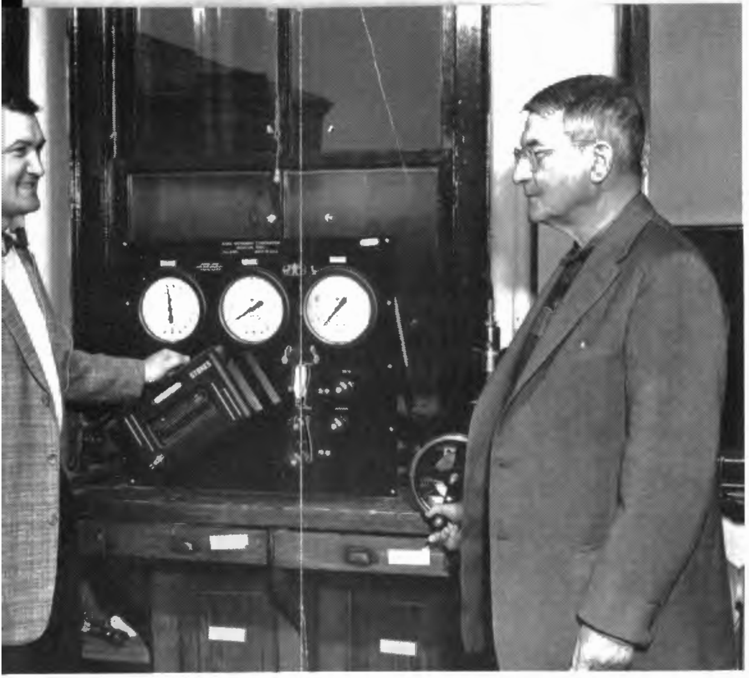


Professor Webster Kay counsels a student in his laboratory on his high-pressure thermodynamic hydrocarbon research. Modern equipment in up-to-date buildings will help keep such highly qualified faculty members and help to attract others.

Professor Aldrich Syverson (below) is well known for his investigations into reaction kinetics. How much value does one place on high-quality faculty research?



Professors Edward V
H. C. Slider, of the
Division shown with
pressure



Professors Edward V. O'Rourke (right) and H. C. Slider, of the Petroleum Engineering Division shown with the mercury capillary pressure apparatus.

Professor Charles E. Dryden specializes in nuclear, heat transfer, and electro-chemistry. One department aim is to keep pace with modern chemical engineering concepts.

Professor Christie Geankoplis with two chemical engineering students (below) in the small laboratory housing his project on mass transfer investigation. These are modern chemical engineers, not alchemists.

OUR NEEDS — OUR GOAL

It has been pointed out that the new Chemical Engineering Building will require about $1-million worth of equipment. The value of the present equipment represents about $180,000, leaving about $820,000 in additional equipment money needed to furnish the building properly. Of this amount the University has allocated about $370,000 and it is reasonable to expect that an additional $50,000 will be available through educational discounts.

Of the potential deficit of about $400,000, it is expected that alumni of Chemical Engineering and Petroleum Engineering will contribute about $115,000. It is hoped that the chemical industry will contribute the remaining $250,000 for necessary equipment.

If, as is expected, this investment will permit doubling the number of Chemical Engineering graduates from Ohio State in the next 25 years, the outlay of $400,000 represents only about $250 for each additional graduate, or less than a half of one month's salary.

The current investment of a chemical company per employee is about $20,000, and this will no doubt be $25,000 within a few years. The $250 per graduate represents, then, a mere one per cent of that investment. The $400,000 will pay dividends in additional highly-trained Chemical Engineering graduates.

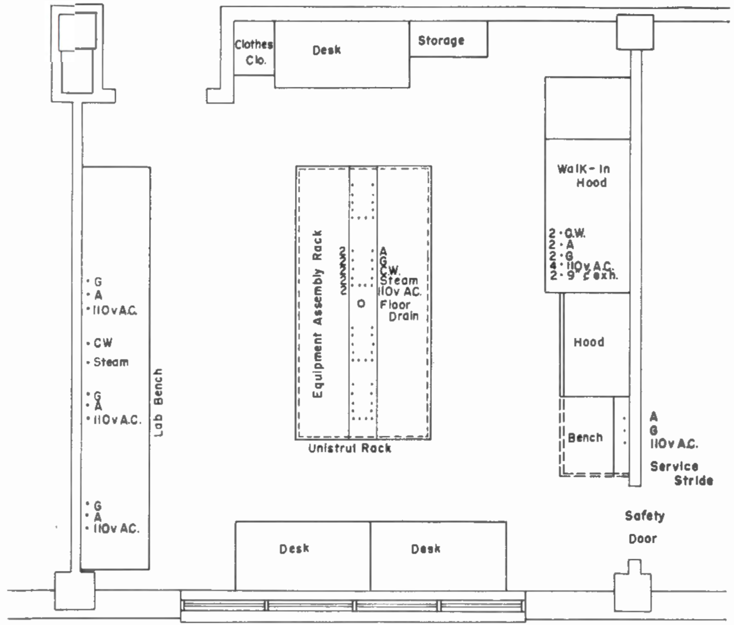
Professors Edwin E. Smith (right) and Peter Otto Krumin (top photo) supervise and conduct research in the fuels laboratory. They are shown with samples of Ohio crude oils on which much research has been done. Water resources and waste treatment research is necessary in this era. Professor W. D. Sheets is pictured at the Water Resources Center with the Warburg Manometric unit.

Laboratories — The Backbone

The laboratory is the backbone of training for a Chemical Engineering student. Among the "packages," part or all of which may be donated by individual persons or companies, are 12 graduate student laboratories (sketch at right), and nuclear chemical engineering, process development and kinetics, photomicroscopic, thermodynamic and phase, mass transfer, precision standards, optical analysis, electrochemistry, and general laboratories.

The graduate student laboratory package will include necessary minimum equipment and furnishings for graduate research. Provisions will be made for appropriate plaques or markers on the doors to identify the donors. Graduate laboratories will cost about $8,000 each to equip.

Other needs include computation room, glass blowing, photographic facilities, duplicating facilities, and machine shop. Petroleum Engineering will need outside and inside production, and reservoir and drilling fluid laboratories. The provision of such equipment is a major concern in the formal training of both graduate and undergraduate students.



GRADUATE STUDENTS LABORATORY

To Our Alumni:

When I think of chemistry and of chemists and of chemical engineers, I think of nylon, orlon, dacron, pliofilm, cellophane, ethyl gasoline, and fast-drying paints. These are all products in which Ohio State University graduates had a hand, or better still, a head.

How much new wealth for America do you suppose was created by your fellow graduates of this University? How many new plants were built and people put to work? This is one of our good arguments when we go to the Governor and General Assembly for operating funds for the University. An even better argument, I sometimes think, is to tell them the story of the generosity of alumni and friends to this university through the alumni-sponsored Development Fund. Millions of dollars in the past twenty years (eight million, in fact).

And now you Chemical Engineering alumni are being asked to do something new and different--kick in to provide important money for research equipment for your new building. This is not to be ordinary equipment--the State of Ohio MUST supply that; this is specialized research equipment without which the Chemical Engineering Department would be handicapped, indeed. Dean Bolz of Engineering and Gordon Carson, former dean and now business manager, tell me that they have asked for all the regular equipment they dare. Hence, this new project comes to YOU. The venture has the sanction of the Development Fund Board of Directors who hope, of course, that you may have a dollar or two left when the regular, annual Fund solicitation reaches you.

Joe Koffolt has a good point when he says that what industry does to help provide this research equipment will greatly depend on what the alumni are willing to do. (Industry is being solicited, too, your own company included).

This is the first solicitation of its kind here and we are all watching you with interest, and with hope.

Cordially yours,

Jack Fullen

John B. Fullen
EXECUTIVE DIRECTOR,
Development Fund

February 10, 1959

The Ohio State University Monthly Has Said

"To be 10% below the national average in state expenditures for all of education, and to be 1.4% off the national average in state support of higher education seems somehow incredible for our proud commonwealth, Ohio, the fourth wealthiest state, ought to be close to the top, not so near the bottom."

WHY Give to a STATE University?

The reply most commonly heard to this question is, "Industry pays taxes to support state universities so why should we give more?" It's true that state universities receive support from corporate taxes, but let's look at the size of this support.

During the fiscal year 1957 corporate organizations paid \$33,000,000 into the General Revenue Fund in the form of corporate franchise tax at 1/10 of 1 per cent and sales tax on non-manufacturing equipment, supplies, etc. at 3 per cent. Other sources, mainly the retail sales tax, increased this to \$421,000,000. On the basis of current taxation, a hypothetical company with assets and liabilities of \$10,000,000, sales of \$20,000,000 and capital stock, surplus, undivided profits and borrowed capital of \$3,000,000 would have paid about \$5,000 into the General Revenue Fund. Prorating this figure on the basis actually appropriated by the legislature, the company's share to The Ohio State University would have been \$160.

Of your tax dollar, the University receives about 3 cents. Isn't it in the interest of your company to invest in equipping the Department of Chemical Engineering where every cent will be used to provide trained men? Our goal is \$400,000. The state has invested \$2,400,000 or six dollars for each one we ask you to invest.

Would you like to know the tax support to Ohio State from your company? Your fiscal officer can provide you with the information to make the computation, shown at the right.

The Chemical Engineering Building progresses.

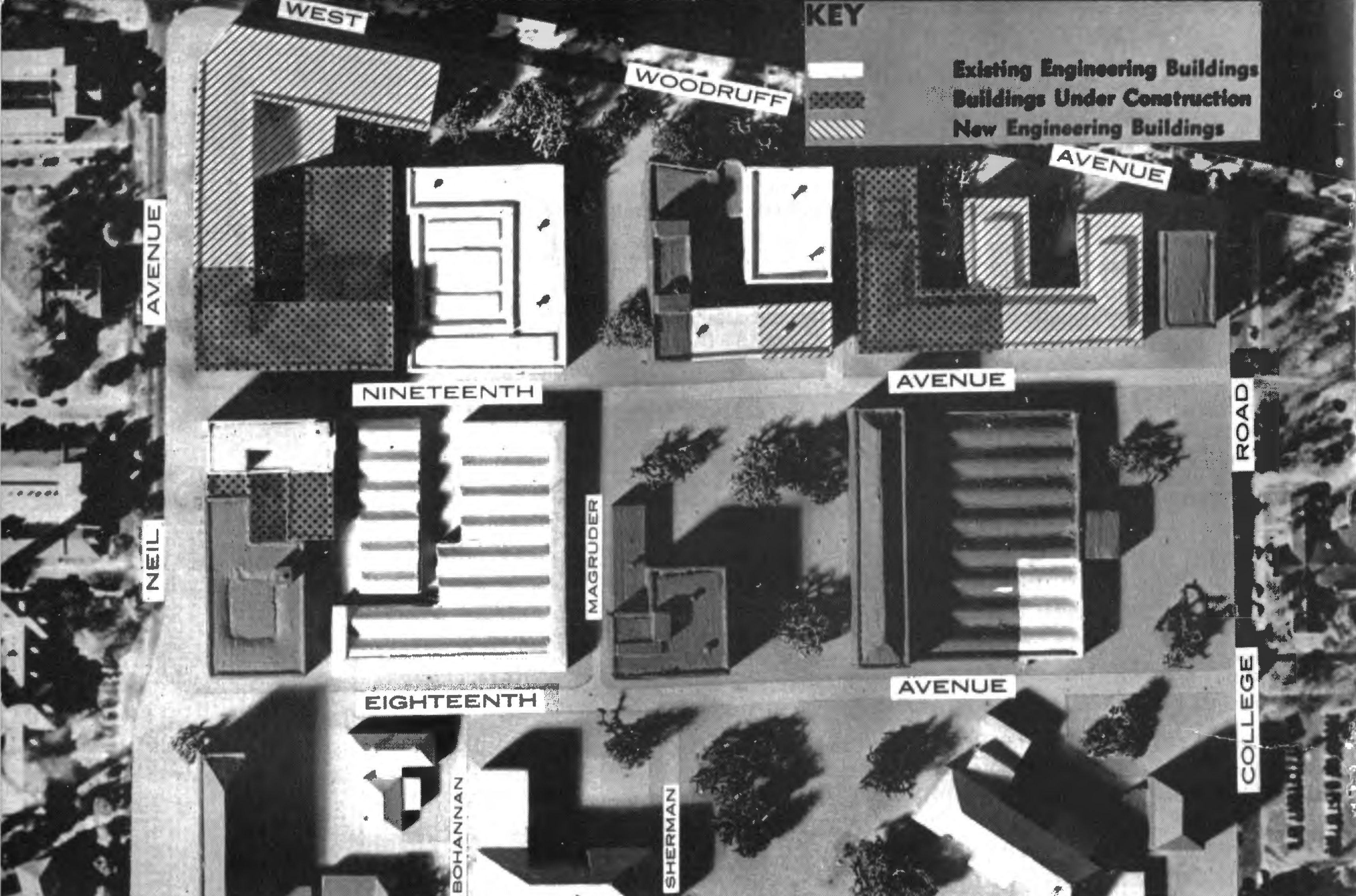
Corporate Franchise Tax
—capital stock, surplus, undivided profits, and borrowed capital at 1/10 of 1% . . . . \$.............. × 0.001..............

Sales Tax—on non-manufacturing equipment, supplies, etc. @ 3% . . . \$.............. × 0.03 ....

Total Tax to State Government . . . .

Multiply by . . . . × 0.0317

Tax support to The Ohio State University . . . . \$..............



KEY
Existing Engineering Buildings
Buildings Under Construction
New Engineering Buildings
WEST
WOODRUFF
AVENUE
AVENUE
NIETEENTH
AVENUE
NEIL
MAGRUDER
ROAD
COLLEGE
AVENUE
EIGHTEENTH
BOHANNAN
SHERMAN

MELVIN DE GROOTE
6611 Pershing Ave.
St. Louis 30, Mo.

PERSONAL HELP WANTED
Must be Ohio State Graduate Chemical Engineer: Outstanding Opportunity of a lifetime. Benefits surpass all belief. Must have Immediate Response.

Dear Fellow Alumnus:

For some unknown reason you did not respond to the above advertisement when it first came to your attention. Of course, it was not exactly in that form, but the sum and substance was the same. Recently you, and other alumni of the Chemical Engineering Department, received a letter and brochure from Joe Koffolt. As you remember, the purpose of this communication was to solicit your help in the provision of suitable research equipment for use in the beautiful new Chemical Engineering Building provided by the University.

You will recall the points Joe made:

When the new building (cost $2,370,000) is dedicated in May, 1960, we'll have the greatest Chemical Engineering education center in the world.

But -- we need additional money to equip it. This money must come, not from the State, but from private sources, namely, the alumni and companies that support Chemical Engineering at Ohio State University.

The first step to obtain this money is to make an outstanding alumni showing because these companies will want to know, before they make their commitments, if we the alumni are backing the project with our pledges.

So -- your pledge is supremely important to this project and to Joe.

We urge you to join now the other alumni who are contributing generously so that all of us can show our appreciation of the education we received by helping the future engineering students who follow us. No one is expected to "give 'til it hurts" -- just give so it helps -- and don't forget such gifts are tax deductible.

Will you please fill in the enclosed pledge card indicating your support for which we will express our appreciation.

Sincerely,

Melvin De Groote

Melvin De Groote

P.S. In case you have already contributed, please excuse our communications hysteresis lag.

PLEDGE CARD 1959

In consideration of my interest in the progress of the Department of Chemical Engineering, The Ohio State University, I will contribute to THE OHIO STATE UNIVERSITY DEVELOPMENT FUND PROJECT 5650—DEPARTMENT OF CHEMICAL ENGINEERING, RESEARCH EQUIPMENT FUND

....DOLLARS $..............................

to be paid as follows:

☐ In full on or before..

☐ In installments as follows:

....

....

Signed:

....
(Name)

....
(Address)

....

....

Checks may be made payable to The Ohio State University Development Fund, and mailed to:

Joseph H. Koffolt, Chairman
Department of Chemical Engineering
The Ohio State University
108 W. 18th Avenue
Columbus 10, Ohio

Gifts are deductible for income tax purposes.

A letter was also sent out under the signature of Professor H. C. Slider and J. H. Koffolt.

Melvin DeGroote followed these letters by letters to those who did not contribute. Over a 1,000 letters were sent out by Dr. DeGroote.

It was decided that we would request for volunteers of the alumni. The names and the cities are given below.

E. P. Arthur - Los Angeles	Paul A. Fodor - Pittsburgh, Pa.
Melvin DeGroote - Los Angeles	Glenn L. Gifford - Pittsburgh, Pa.
R. W. Conaway - Los Angeles	George H. Whipple - Pittsburgh, Pa.
Andrew E. Chute - Los Angeles	R. H. Crossley - Connecticut
J. Howard Kerstetter,Jr. - St. Louis	Kurt M. Dubowski - Florida
Edward H. Loeb - Chicago, Ill.	Robert N. Miller - Georgia
H. B. Taylor - Chicago, Ill.	H. G. Rohrer - Indianapolis
Charles J. Schmitz - Chicago, Ill.	Arthur N. Masse - Kentucky
Donald A. MacDougall - Whiting, Ind.	Walter E. Donham - Baton Rouge, La.
Charles M. Kincaid - Lombard, Ill.	Forrest R. Hurley - Maryland
B. R. Hall - Wilmington, Delaware	Charles D. Helm - Maryland
Robert E. Albert - Wilmington, Del.	D. D. David - Maryland
Alvin B. Stiles - Charleston, W. Va.	Samuel L. Shenefield - Michigan
B. R. Sarchet - Pittsburgh, Pa.	Robert L. Bates - Dayton, Ohio

I am sure that there were others for whom we do not have a record. These men canvassed their localities and submitted a form concerning the status of contribution.

Over 790 alumni or 52% contributed to the Development Fund. At last count the contributions totaled more than $300,000.00.

In the meantime, many meetings were held either in the offices of B. F. Goodrich Chemical in Cleveland or on the Ohio State University campus. Dean Marion Smith, Dean Harold A. Bolz, Harry Warner, Dr. DeGroote, J. H. Koffolt, and Dr. Syverson participated in some of these meetings.

A meeting was held on November 15, 1960 in Cleveland. Harry Warner had Allen Blackburn, a professional fund raiser, give suggestions on how it should be conducted. He was paid $250 for this by Harry Warner and Dr. Melvin DeGroote. He recommended that we hire a professional fund raiser which would have cost us highly. We therefore decided to conduct the campaign by ourselves.

Two fellowships were contributed to the department. John and Lucille Roberts of Huntington, West Virginia left their property to the Department of

Chemical Engineering for the establishment of a fellowship. Their contribution amounted to $86,000.00. Their fellowship is known as the John and Lucille Roberts Memorial Fellowship.

Dr. Arno C. Fieldner, one of the first two graduates in Chemical Engineer Engineering, left $75,000.00 to the department for the Arno C. Fieldner Research Fellowship.

Donations are still coming in for this project.

DEDICATION OF THE CHEMICAL ENGINEERING BUILDING

The Chemical Engineering Building was dedicated May 5, 1960. There were over 500 persons at the dedication ceremonies and over 250 at the dinner at the Jai Lai Restaurant. The national officers of the American Institute of Chemical Engineers played an important roll in the dedication. They were Jerry McAfee, Vice President of Gulf Oil and President of A.I.Ch.E; John Healy, Vice President of the Institute and an executive of the Monsanto Company in St. Louis; and W. K. Menke, National Director of the Institute and also President of the United States Steel Chemical Division. Dr. Sidney D. Kirkpatric, past President of the Institute and Vice President of McGraw Hill Company was the speaker. The title of his talk was "Upward and Onward Chemical Engineering at Ohio State University." He also said that the title of his talk could be "Koffolt Kollege of Kemical Knowledge." A copy of the dedication program follows and also a write-up of the dedication. This appeared in Chemical and Engineering News, May 9, 1960.

DEDICATION

Chemical Engineering Building

The Ohio State University

Thursday, May 5, 1960
at 3:30 p.m.

THE CHEMICAL ENGINEERING BUILDING

This is the first Engineering building to be dedicated under the 10-year building program developed in 1954 and expedited by Ohio State Vice President Gordon B. Carson, who was then Dean of the College of Engineering. The first step toward the reality of the new Chemical Engineering and Mineral Industries Building occurred in December, 1955, when the State Capital Planning and Improvement Board approved the $2,400,000 item submitted by the Inter-University Council. The University Board of Trustees approved plans for the new building at its September, 1957, meeting, and ground was broken by President Novice G. Fawcett January 15, 1958.

The gross area of the new building is 80,000 square feet, with head room varying from 9 to 52 feet, depending on the laboratory. There is a total of 50 laboratories, of which 13 are individual laboratories to accommodate 35 graduate students. A total of about 70 graduate students will also be accommodated in other special laboratories such as mass transfer, kinetics, thermodynamics, etc. The new building will provide facilities for 400 students, or double the capacity of the former quarters.

The Alumni Committee of 100 for Engineering played a substantial role in the realization of the building and in conducting the alumni and industry solicitation which permitted equipping the laboratories with the additional and special research equipment so vital to graduate education and research.

The new building houses all of Chemical and Petroleum Engineering and part of Metallurgical Engineering. The next phase in the building plans is completion of facilities for Metallurgy, Ceramic Engineering, and Mineralogy. The building is integrated in the Engineering and Chemical Center—to the East is the new Chemical Abstracts building, to the West is the Engineering Experiment Station, and to the South is the Chemistry Building.

DEDICATION PROGRAM

Chemical Engineering Building

Thursday, May 5, 1960

P.M.

1:00 **Open House**

3:30 **Unit Operations Laboratory**

Presiding:

HAROLD A. BOLZ
Dean, College of Engineering

Invocation:

HIS EXCELLENCY CLARENCE GEORGE ISSENMANN
The Most Reverend Bishop of the Diocese of Columbus

Introduction of Honored Guests

Remarks:

JOSEPH H. KOFFOLT
Chairman, Department of Chemical Engineering

JERRY MCAFEE
President, American Institute of Chemical Engineers, and
Vice President, Gulf Oil Corporation, Pittsburgh, Pennsylvania

MELVIN DE GROOTE
Vice President, Tetrolite Company, St. Louis, Missouri

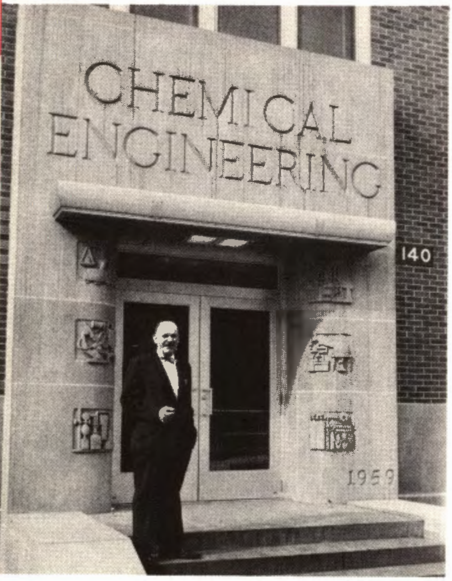
GORDON B. CARSON
Vice President, Business and Finance, The Ohio State University

NOVICE G. FAWCETT
President, The Ohio State University

JUDGE ROBERT GORMAN
Chairman, Board of Trustees, The Ohio State University

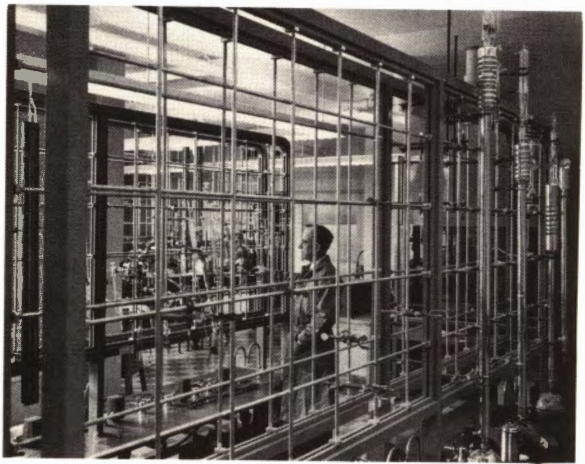
Benediction: MILTON D. MCLEAN
Coordinator of Religious Affairs

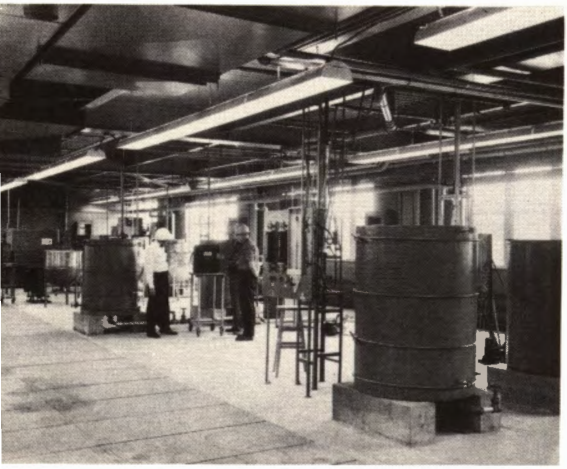
Scenes from the New Building



Professor Joseph H. Koffolt, Department Chairman, at the entrance to the new Chemical Engineering Building, 140 West 19th Avenue

Professor Webster B. Kay in the Physical Measurements P-V-T Laboratory





Unit Operations Laboratory —Third Floor

Installing Equipment in the Unit Operations Laboratory

The following named persons have expressed their loyalty as Chemical Engineering alumni by their contributions to the equipment fund for the new building:

Abraham, G.
Adovasio, C.
Agapetus, N. A.
Alexander, P.
Alkire, R. J.
Allen, R. B.
Allen, R. M.
Almen, H. W.
Altamira, A.
Althoff, E. O.
Althouse, G. F.
Anderson, H. G.
Anderson, R. J.
Andrews, W. F.
Aneshansley, C. H.
Annan, T. P.
Armstrong, R. S.
Arnold, D. S.
Arnold, R.
Arthur, E. P.
Asher, W. J.
Austen, H. E.

Bailey, R. E.
Bak, E.
Baker, D. B.
Baldner, R. L.
Baque, W.
Barker, J. E.
Barnebey, H. L.
Barron, S.
Bates, P. E.
Bates, R. A.
Bates, R. L.
Baum, A. W.
Bauman, F. A.
Bayliss, W. R.
Bazler, S. M.
Beacham, C. C.
Beckel, D.
Beebe, P. S.
Beer, T.
Benford, Jr., C. L.
Berk, Jr., W. J.
Beuk, V.
Blazey, L. W.
Blume, P. W.
Blunden, J. R.
Boardman, C. H.
Boggs, R. L.
Bohnslav, E.
Boker, H. A.
Bollinger, E. H.
Bonn, G. S.
Booth, B. C.
Bornhorst, P. J.
Bostwick, L.
Bowsher, H. D.
Boyd, C. E.
Boyd, T. A.
Braidech, M. M.
Brantner, J. W.
Breithaupt, C. E.
Briggs, R. L.
Broestl, E. A.
Brookover, G. B.
Brooks, H. E.
Buehner, J. F.
Buike, M. L.
Bunn, L. T.
Burgbacher, J.
Burt, W. I.
Buskirk, D. E.
Butts, D. C.
Byerly, J. W.

Caldwell, H. G.
Cammarn, J. W.
Cammerer, N. C.
Campbell, W. L.
Canfield, L. B.
Cannon, E. J.
Capell, L. J.
Caris, P.
Carlson, L. A.
Carter, A. L.
Case, L. B.
Caskey, J.
Celli, F. J.
Chambers, H. E.
Chang, I. B.
Chapman, S.
Chetrick, M. H.
Child, R. K.
Chubb, Jr., L. W.
Chute, A. E.
Claflin, Jr., H. C.
Clark, D. N.
Clark, J. H.
Clark, R. A.
Click, C. N.
Cody, R. A.
Coe, W. D.
Coith, H. S.
Conaway, R. W.
Conn, M. F.
Cooper, H. G.
Corell, E. J.
Cost, J.
Cover, M. D.
Cox, N. R.
Craver, J.
Creagh, J. P.
Crehan, W. J.
Crossley, R. H.
Crowe, D. H.
Curtis, H.

Damous, J.
Dannemiller, H. S.
Darby, R. L.
Davis, K.
Davis, N. P.
DeBruin, W. H.
DeGroote, M.
Detamore, L. A.
Dewart, R.
Donham, W. E.
Doutt, F. V.
Draghic, J.
Drake, D. F.
Dresher, F. E.
Drummond, F. E.
Dryden, C. E.
Dubes, R. F.
Dubowski, K. M.
Dudley, R. E.
Dumbauld, G. K.
Duncan, D. W.
Dunn, P. S.
Dupre, D. D.
Durr, F. L.

Earhart, W. H.
Eastman, F.
Elliott, J. M.
Elsaesser, L. O.
Emmons, R. J.
Entwisle, B.
Ernest, F. M.
Etter, D. O.
Ewing, T. M.
Eysenbach, J. W.

Facer, J. R.
Fanning, H. H.
Farison, R. E.
Farst, J. R.
Fatica, N.
Fell, W. K.
Fenburr, H. L.
Ferguson, H. M.
Ferguson, R. H.
Fieldner, A. C.
Findlay, D. E.
Fischer, R. C.
Fishback, A. L.
Fisher, J. T.
Fisher, W. R.
Fitz, R. A.
Fleming, C. E.
Fletcher, C. L.
Fligor, K. K.
Fodor, P. A.
Fok, S. M.
Fondy, P. L.
Forbes, W. W.
Ford, F. A.
Fosdick, L. B.
Foster, R. H. K.
Francis, D. A.
Fritz, H. E.
Froning, J. F.

Galloway, J. R.
Garrett, D. E.
Garrett, R. M.
Garris, R. W.
Gartner, D. H.
Gaulke, P. K.
George, A.
George, D. H.
George, W. T.
Gerlach, J. G.
Gibbons, J. H.
Gifford, G. G.
Giles, B. D.
Glancy, W.
Glaser, R. A.
Golden, C. E.
Golub, L.
Gordon, A.
Grandey, L. F.
Graves, T. L.
Graves, W. H.
Green, Jr., H. J.
Green, H. L.
Green, R. C.
Grice, H. H.
Grimes, W. W.
Guy, Jr., A. C.
Gunyou, E. B.
Guillaudeu, A.

Hahn, J. C.
Hall, C. R.
Hall, R. E.
Haller, E. D.
Hamilton, D. R.
Hammond, R. D.
Hammond, W. A.
Hanson, F. L.
Harbour, R.
Haring, D. C.
Harman, C. T.
Harris, L. A.
Harris, V. J.
Harris, W. R.
Hartley, B. C.
Harvey, J. K.
Haselbarth, J. E.
Hatten, M. E.
Haughton, J. P.
Haupt, D. E.
Haverfield, T.
Haverly, C.
Hawk, E. L.
Hawkey, R.
Hazel, J. J.
Hazelton, J. P.
Hazelton, R. P.
Hearn, J. V.
Heidenreich, A. C.
Heintz, R. P.
Helm, C. D.
Helms, J. D.
Hendrickson, E. C.
Henninger, F. R.
Herndon, L. K.
Hewitt, R. T.
Higinbotham, G.
Hill, J. C.
Hill, J. R.
Hill, P. L.
Hoeckelman, R. F.
Hoelscher, J. L.
Hoelscher, R. L.
Hoffman, D. F.
Hoge, J. H.
Hoge, W. H.
Holm, P. O.
Homans, R. H.
Hoorman, J. H.
Horch, C. H.
Horn, A. W.
Hoskins, J. E.
Howard, G. E.
Howard, O. G.
Hubbell, D. S.
Huchro, S. P.
Hudnall, J. R.
Huffman, D. D.
Huffman, P. B.
Huffman, R. L.
Hull, G. R.
Hullinger, L. C.
Huntington, R. L.
Hurley, F. R.

Immel, R. H.
Innis, R. C.
Ireland, J. D.
Irwin, J. F.
Izant, P. W.

Jackman, H. W.
Jackson, W. E.
Jacobs, K. S.
Jeffrey, A. D.
Jenney, T. M.
Johnson, H. C.
Johnston, S. S.
Jones, A. E.
Jones, L. G.
Jones, W. E.
Juve, A. E.

Kaiser, W. C.
Katz, S. H.
Kearns, Jr., C. H.
Keifer, B. F.
Kelly, P. W.
Kennedy, D. W.
Kennedy, W.
Kersteter, H. J.
Kidd, M. C.
Kienholz, P. J.
Kimmel, E. E.
Kincaid, C. M.
Kintner, R. C.
Kirkman, F. S.
Kirkpatrick, S. D.
Klassen, H. C.
Kleinmaier, L. E.
Klemowicz, C. H.
Klink, W. A.
Knapp, W. D.
Knapp, W. G.
Knight, H. C.

Koch, G. E.
Koebel, N. K.
Koegle, J. S.
Koerner, V.
Koffolt, J. H.
Kohli, E. C.
Kolbas, J. M.
Koprowski, T. E.
Kraus, P. B.
Krieger, W. M.
Krock, A. W.
Kruger, Jr., R.
Kuhlman, D. W.
Kuntz, T. S.

Lacy, K. C.
Lambillotte, J.
Landes, C.
Landin, C. F.
Lange, H. B.
Larcamp, W. L.
Laughrey, P. W.
Lawless, R. M.
Layfield, E.
Laymon, H. W.
Lieverman, A. R.
Lilley, R. G.
Lindsay, J. T.
Ling, W. C.
Lisle, H. C.
Litvin, M.
Lodge, W. S.
Loy, T. R.
Lucas, L. K.
Luckey, G. W.

Ma, J. L.
Maag, W. L.
MacDougall, D. A.
MacLaren, M. D.
Maddex, P. J.
Mahaffey, J. L.
Mahoney, J.
Maeder, R. E.
Malavazos, J. C.
Manchester, F. H.
Marquand, C. B.
Martin, J. B.
Martin, R. C.
Mason, G.
Mayer, A. G.
Mayforth, F. R.
Mayne, D. I.
McAdams, M. M.
McCall, C. A.
McColloch, L. C.
McDaniel, K. A.
McEwen, J. M.
McFarren, G. A.
McGinnis, H. C.
McGriff, H. H.
McKinney, J. W.
McLean, T. J.
McLellan, K. M.
Mead, W. J.
Medin, A. L.
Mendiola, J. N.
Menendin, R. A.
Mercer, K. K.
Meredith, W. R.
Merryman, R. G.
Meyer, D. A.
Michael, L. E.
Michel, W. J.
Midlam, R. R.
Miller, D. C.
Miller, R. N.
Milligan, L. H.
Millisor, H. L.
Mills, N. A.
Mills, P. A.
Milne, J. R.
Mitchelson, J. B.
Mong, P. E.
Montgomery, G. H.
Moore, H. C.
Morrison, A. R.
Morrow, R.
Mougey, H. C.
Mourad, G.
Mravec, J. G.
Mueller, F. L.
Mutersbaugh, G. H.

Nelson, J. R.
Nesbitt, G. A.
Neunherz, D. E.
Newman, W. D.
Nieman, A. H.
Noll, R. F.
Norris, W. L.
Nowacki, L. J.

Ogan, L. H.
Ogden, R. E.
Ogleve, H. J.
Olafson, R. S.
Olnick, J. E.
Olson, H. S.
Onsel, E. J.
O'Roark, J. R.
Outcault, H. E.
Ovesen, A. B.
Oyler, L. T.

Parker, L. A.
Parkinson, J. R.
Phillippi, D. M.
Phillips, B. S.
Planck, I. A.
Plotts, D. B.
Pontius, E.
Poor, W. B.
Porthouse, C. R.
Portz, W. W.
Powell, D. E.
Price, F. C.
Pritz, W. B.
Puriton, Jr., J. A.

Quigley, H. W.
Quigley, Mrs. M.

Rado, T. A.
Ramos, M.
Ratchen, J. H.
Rechtin, H. J.
Reeves, P. W.
Reho, S. F.
Rein, Jr., H. F.
Reinmuller, E.
Reiss, C. E.
Reiss, R. T.
Retzke, F. A.
Riccardi, S. A.
Rice, D. P.
Rife, H. M.
Rinehart, V. R.
Roberts, J. W.
Robinette, D. O.
Robinson, G. D.
Robinson, H. L.
Robinson, Jr., J. R.
Robson, J. T.
Rolph, E. D.
Rose, P. E.
Rosenberger, E. C.
Roth, C. E.
Rowand, R. P.
Roy, L. F.
Ruff, C. D.
Ruff, M. H.
Rumsey, D. W.
Ruscilli, A.

Salonga, L. C.
Sarchet, B. R.
Savage, H. J.
Saylor, R.
Scharf, E. J.
Scharf, M. D.
Scheiber, R. E.
Schlea, C. S.
Schmitz, C. J.
Schneider, G. M.
Schneider, R. E.
Schroeter, D.
Schuh, F. J.
Scutt, H. L.
Seabright, L. H.
Seaton, W. H.
Sebenick, J. J.
Seeds, D. H.
Seguin, V. C.
Sennett, F. E.
Sercelj, F. J.
Serfass, R. W.
Seyler, H. W.
Shaeffer, D. W.
Shafer, B. J.
Sheets, W. D.
Shenefield, S. L.
Shenker, S.
Sherrard, J. E.
Shimrock, T.
Shorkey, A. F.
Shurtz, R. F.
Sindlinger, C.
Slowter, E. E.
Slyker, R.
Smith, A. H.
Smith, E. E.
Smith, R. E.
Smoots, J. P.
Snider, R. F.
Sobala, H.
Spade, R. D.
Spaite, P. W.
Speed, D. B.
Speer, R. E.
Sprague, P. D.
Steele, H. R.
Stelzer, H. L.
Stephan, D.
Stern, A.
Stewart, J. C.
Stiles, A. B.
Stoechel, D. C.
Story, R. N.
Strahl, C.
Straker, J. W.
Strang, D. A.
Street, L. P.
Street, S. W.
Strickler, Jr., G. C.
Strigle, Jr., R. F.
Stuber, P. J.
Sumner, E. C.
Svoboda, C. J.
Sweeney, M. P.
Syverson, A.

Tallarico, M. A.
Tarr, R. M.
Tawney, M. D.
Taylor, H. B.
Taylor, W. A.
Teale, C. W.
Teichert, C. O.
Temple, C. J.
Teres, J.
Thacker, Jr., C. C.
Thomas, D. G.
Thomas, D.
Thomas, F. L.
Thomas, W. D.
Thompson, R. E.
Tibbits, T. J.
Tobias, G. S.
Toppari, J. E.
Trexler, C. E.
Trostel, L. J.
Truesdell, D. A.
Truex, G. L.
Tucker, W. M.
Turnbull, E. D.

Ulmer, P. F.

Vaclavik, F.
Van Arnum, W. H.
Veley, F. A.
Verkamp, J. P.
Vetter, F. W.
Vogel, R. B.
Vorum, D. A.

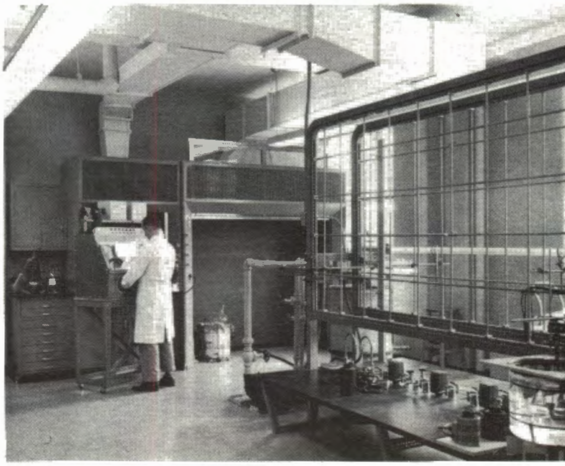
Walden, P.
Waldron, J.
Walke, E. W.
Wallace, A. E.
Wallin, J. M.
Walsmith, J. L.
Walter, J. W.
Warner, H. B.
Warner, R. E.
Weber, C. W.
Weir, D.
Weisel, J. W.
Wells, L. S.
Wells, P. L.
Wendschuh, W. C.
Wening, H. E.
Werner, H.
Whipple, G. H.
Whitaker, R. T.
Whitehead, K. E.
Whiston, R. R.
Whitmire, P. T.
Widman, J. F.
Wilcox, P. W.
Wilhelm, D. J.
Wilkinson, B. W.
Williams, A. E.
Williams, T. B.
Williams, W. H.
Wing, K. L.
Winterkamp, F. H.
Wise, H. F.
Wiss, J. E.
Withrow, A. E.
Wolcott, R. H.
Wolfe, Jr., W.
Wolfe, W. D.
Wolfson, B.
Wright, H. E.

Yarrington, R.
Yee, H. T.
Yenkin, F.
Yerina, F.
Young, J. H.
Young, R. M.

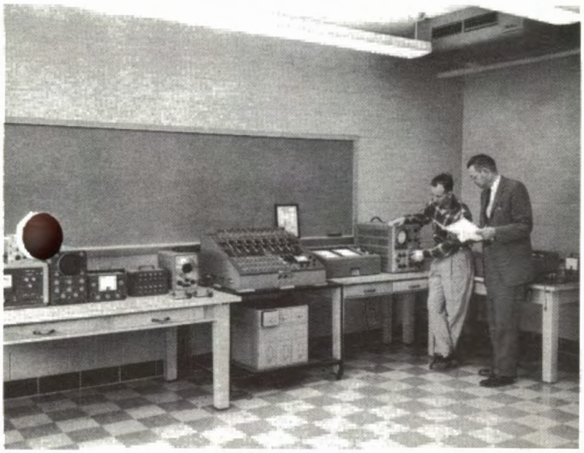
Zind, F.
Zwelling, M.

Scenes from the New Building

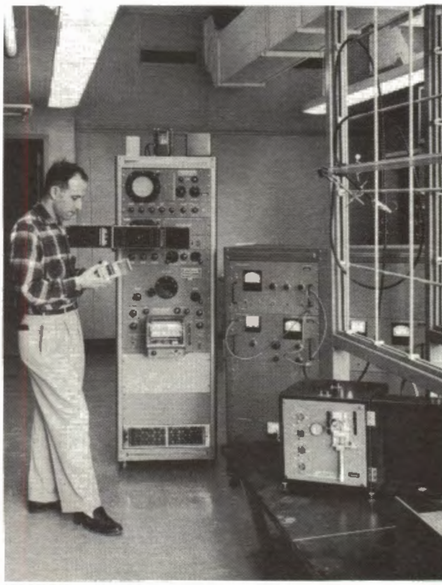
Using Carbon 14 in the Radiotracer Laboratory

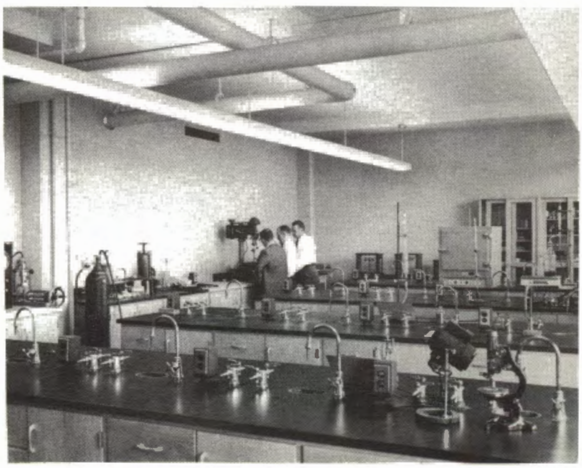


Professors Robert S. Brodkey (left) and Aldrich Syverson in the Analog Computer Laboratory



Professor Robert S. Brodkey in the Turbulence Research Laboratory. The equipment shown includes a spectrum analyzer, hot film anemometer, and micro manometer





The Reservoir Petroleum Engineering Laboratory

HISTORY OF THE DEPARTMENT

The first official curriculum in Chemical Engineering was initiated in 1902 as a division of the Department of Chemistry. In 1906 the first two Bachelor's degrees were conferred on Louis Benjamin Case and Arno Carl Fieldner. Dr. James R. Withrow headed the division from 1906 to 1925, and when the Department of Chemical Engineering was authorized in 1925 Dr. Withrow was appointed chairman and served in that capacity until his retirement in 1948. Dr. Joseph H. Koffolt, the present chairman, was appointed in 1948 to succeed Dr. Withrow.

A total of 2293 degrees has been conferred during the Department's existence. Of the total 1488 are Bachelor, 597 Master, 30 Professional, and 178 Ph.D. The first recipient of the Master's degree was the late Professor Orlando Sweeney in 1910 and a year later, in 1911, Arthur Guillaudeu received the second Master's degree. The first Ph.D. degrees were awarded to Dr. Herbert Spencer Coith and Dr. James Howard Young in 1918.

In 1925 the teaching faculty of the Department numbered 3, and there were 2 industrial fellowships. Today there are 16 members of the teaching staff, 11 industrial fellowships, and 14 undergraduate scholarships.

Alumni of the Department are located with 531 companies in 47 states and 24 countries, and include many with high positions in industry.

EVENING PROGRAM

May 5, 1960

P.M.

6:30 **Annual Banquet**

Central Ohio Section

American Institute of Chemical Engineers
Jai Lai Restaurant—New Orleans Room
Olentangy River Road, between King and Fifth Avenues

Presiding:

LOUIS HULLINGER
President
Central Ohio Section

Remarks:

HARRY WARNER
President
B. F. Goodrich Chemical Company

F. J. VAN ANTWERPEN
Executive Secretary
American Institute of Chemical Engineers

Speaker:

SIDNEY D. KIRKPATRICK
"Mr. Chemical Engineer"
Vice President
McGraw-Hill Book Company
Honorary Alumnus, Department of Chemical Engineering
The Ohio State University

PROGRAM

ANNUAL CONFERENCE FOR ENGINEERS AND ARCHITECTS

Friday, May 6, 1960

A.M.

9:00 **Registration**—*Mershon Auditorium*

General Session—*Mershon Auditorium*

Presiding:

HAROLD A. BOLZ, Dean, College of Engineering

Address:

WILLIAM M. HOLADAY, Chairman
Civilian-Military Liaison Committee (to the National Aeronautics and Space Administration and the Department of Defense) and Special Assistant to the Secretary of Defense (Guided Missiles)

"The Engineer in the Missile and Space Age"

11:30 **Luncheon Session**—*Ohio Union Ballroom*

Address:

DR. GEORGE H. BROWN
Vice President, Engineering
Radio Corporation of America, Princeton, New Jersey

"The Bare Bones of Science"

Presentation of "Distinguished Alumnus Awards"

P.M.

2:00 **Open House**—for those not attending other Technical Sessions

4:00 **Departmental Program**

Presiding:

JOSEPH H. KOFFOLT, Department Chairman

Welcome to Alumni and Anniversary Classes of 1910, 1920, 1925, 1935, 1950, and 1955

Presentation of Student Awards in Chemical Engineering

American Institute of Chemical Engineers—Annual Chapter Scholarship Award

Central Ohio Section, American Institute of Chemical Engineers National Student Contest Problem Awards

American Institute of Chemists Professional Award

The Golden Anniversary Class of 1910

1. Phillip Sidney Beebe
2. Ernest Holman Grant (Deceased)
3. Arthur Guillaudeu
4. William Durbin Lareaux (Deceased)
5. Gilbert George Rosino
6. Orlando R. Sweeney (Deceased)
7. Lear H. VanBuskirk (Deceased)

4:30 **Refreshments**

Open House—Guided tours in the new Chemical Engineering Building by the Ohio State Student Chaper, American Institute of Chemical Engineers. Arrangements will be made for visitors and alumni to visit laboratories and research projects of special interest.

CHEMICAL & ENGINEERING

NEWS

MAY 9, 1960

Newsmagazine of the Chemical World

62

Unusual Marketing Deal Launched in Polypropylene 28

Hybrid Nucleic Acids Built into Living Cells 38

$12 Million Engineering Revamp at Ohio State 44

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- 2-vinylpyridine

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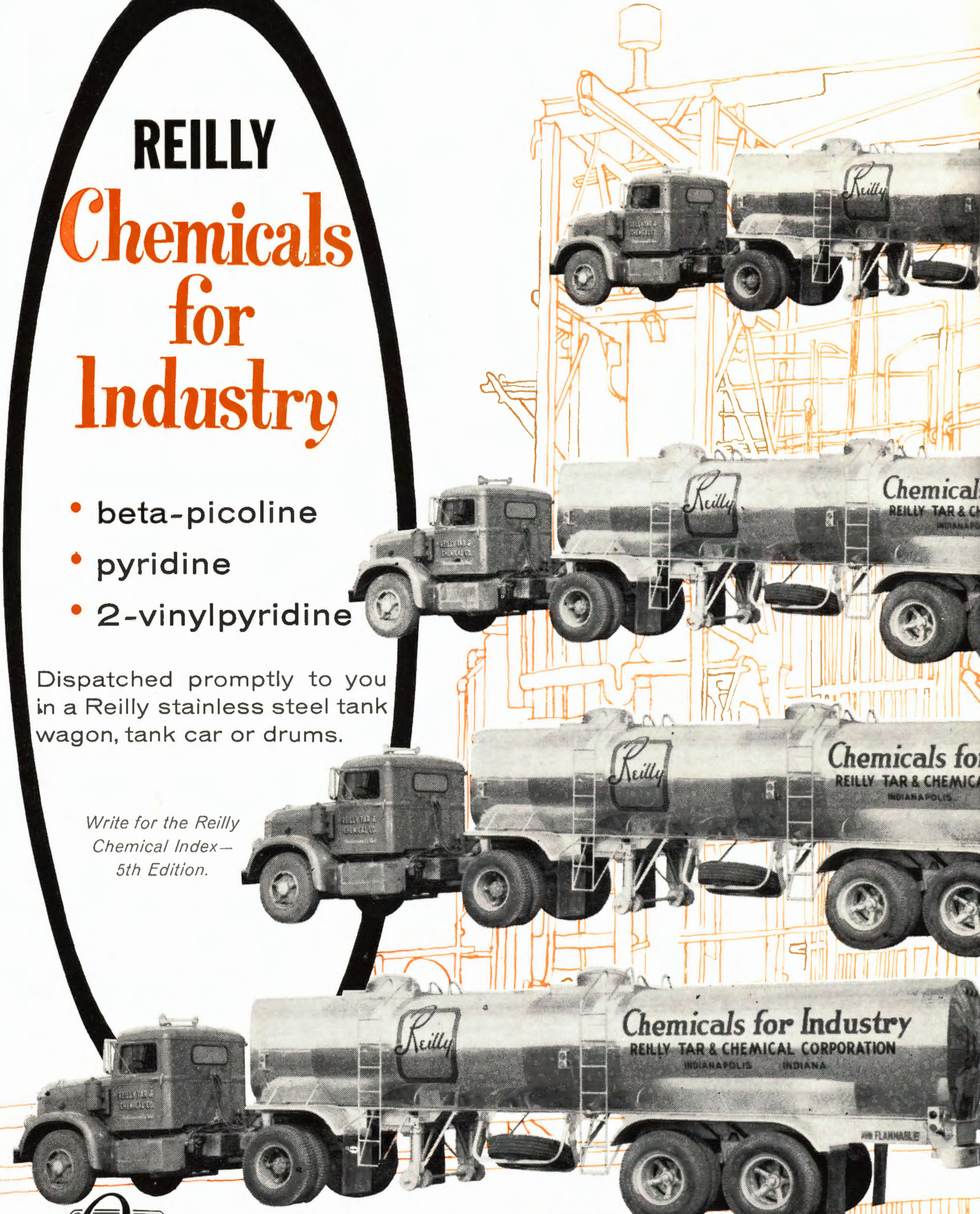

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MERCHANTS BANK BUILDING,
INDIANAPOLIS 4, INDIANA

EDUCATION

GOOD EXPERIENCE. Usable, existing equipment, such as this triple-effect evaporator, was transferred to the new building by the Ch. E. class of June 1960

OSU Dedicates New Ch.E. Building

This $2.4 million unit is the first to be built in Ohio State University's $12 million revamp of its engineering facilities

Engineering had its day at Ohio State University last week, with chemical engineering in the spotlight. OSU's new $2.4 million chemical engineering building was dedicated; the following day was devoted to the Seventh Annual Conference for Engineers and Architects (AEC Day).

Both events featured outstanding guest speakers, including Dr. Jerry McAfee, a Gulf Oil v.p. and president of the American Institute of Chemical Engineers, Sidney D. Kirkpatrick, OSU alumnus and consulting editor to *Chemical Engineering*, Dr. Melvin De Groote, v.p. of Tetrolite Co., and B. F. Goodrich Chemical's new president, Harry Warner. The latter two spearheaded key committees of OSU's development fund.

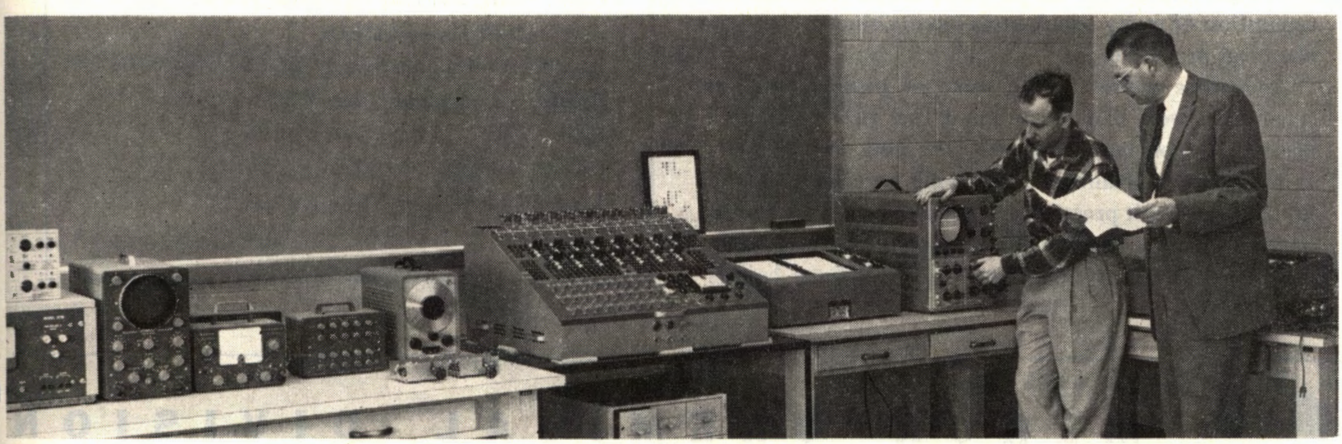
The new chemical engineering building boasts facilities for 400 students, twice the capacity of former quarters, and gross area totals nearly 81,000 square feet. The five-story lab space has steel grating floors, which simplify installation or rearrangement of multistory lab equipment. There are 50 labs, including 13 individual labs intended for 35 graduate students. Also available are special labs such as nuclear engineering, mass transfer, and thermodynamics. All facilities are geared to train chemical engineering graduates to levels of ability required by industry today, says Dr. Joseph H. Koffolt, chairman of OSU's chemical engineering department.

The new building is the first to be dedicated under OSU's 10-year, $12 million engineering building program. Electrical engineering got a new building in 1949, the first new one for engineering since 1924 (when chemical engineering moved from the "black hole" to the "snake pit," which it just vacated). But in 1954 OSU launched a building program with emphasis on chemistry and chemical engineering.

Preliminary planning for the chemical engineering building started in late 1955. OSU's board of trustees approved plans in September 1957, and ground was broken in January 1958. The building was completely occupied in January 1960.

Today, the new building houses all of chemical and petroleum engineering and part of metallurgical engineering. The next building phase will complete metallurgical and add ceramic engineering, mining engineering, and mineralogy. Additional cost of this phase is about $2.5 million, with completion scheduled for 1963.

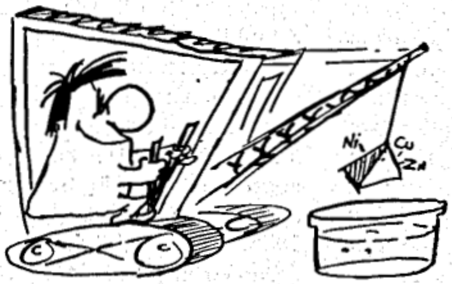
Equipment Needed. But a new building was only part of the need at OSU's chemical engineering department. No department in the college of engineering needed additional equipment as badly as chemical engineering, says Dr. Koffolt. "We have emerged from industrial and wash-tub chemistry to chemical engineering." The transition has been marked by demands from industry for higher quality graduates—a demand that can only be met by having the finest training



MODERN EQUIPMENT. This analog computer at the new facility was built from commercially available kits by OSU chemical engineering students. Dr. A. Syverson (right) and Dr. R. S. Brodkey guided the project

THE 'GENIUS' CORNER

EDTA for choosey chelation



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THE CHEMICAL ENGINEERING ALUMNI

The alumni of the Chemical Engineering Department are very active in the support of the department as indicated in the number that have contributed materially to the department. The Chemical Engineering alumni hold many meetings throughout the country. For example, there were forty eight alumni at the Los Angeles meeting of the American Institute of Chemical Engineers. Meetings have been held in San Francisco; Washington, D.C.; Cleveland, Ohio; New York City; Houston, Texas; Charleston, West Virginia; Wilmington, Delaware and so on. A report is sent out each year to the alumni. A copy of one follows.

THE PRESIDENT'S CLUB

The following alumni have contributed $10,000 and more and are members of the President's Club.

Robert L. Bates
Thomas A. Boyd
Perry S. Fay
Dorothy Joseph Fenburr
Herbert L. Fenburr
Arno C. Fieldner
William A. Hammond
Carl B. Marquand
Cyril R. Porthouse
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Ronald W. Thompson
Raymond D. Hammond

CUM LAUDE CLUB

The following alumni gave $500 or more in any one year. The list for 1968 is given below. Many other alumni have given $500 or more prior to 1968.

Daniel W. Duncan
Parker S. Dunn
Mrs. Parker S. Dunn
Charles I. Fletcher
Fontaine R. Henninger
Leona F. Henninger
Dean S. Hubbell
Mrs. Adolph G. Wassertheurer

CENTURY CLUB

The following alumni gave $100 to $499.99 as was stated in the Cum Laude Club. There are at least four hundred alumni in Chemical Engineering who gave $100 at one time.

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The following named persons have expressed their loyalty as Chemical Engineering alumni by their contributions to the equipment fund for the new building:

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Socony-Mobil Oil Company
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A total of 790 alumni and in a few cases friends of the Chemical Engineering Department contributed to the equipment fund.

Two fellowships in Chemical Engineering were contributed. Namely, Arno C. Fieldner and Mr. and Mrs. John Roberts. These donations amounted to over $75,000 each.

CONTRIBUTORS TO THE CHEMICAL ENGINEERING EQUIPMENT FUND

The following contributed after the program had come off the press, and their names appear on the plaque:

Robert O. Acker
Robert F. Aldrich
Robert H. Allbritain
Earl G. Anderson
Robert S. Atkinson
Robert Babich
Nicolae N. Bacaintan
Ralph D. Baker
Louis C. Beale, Jr.
F. Wayne Beall
Richard N. Beals
Richard J. Bengston
Jack Berger
John P. Berzins
Michael A. Bobal
Maurice E. Bondurant
Hugh and Jane Bone
Bill D. Bottenfield
James B. Braden
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Lloyd J. Breidenbach
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William K. Kinzer
William P. Koontz
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Laurence C. Mapel
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Arthur Masse
Paul L. May
William C. McConnell
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Edward G. Meiter
Alexander K. Mikulski
John H. Miller
Myrl E. Miller
Richard A. Miller
Richard J. Mitchell
Lewis E. Mong
John A. Olah
John R. Oldenburg
Ernest Paskell
Ralph G. Patterson
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Frank R. Porter
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Mrs. J. L. Roberts
Raymond K. Ritzert
Howard G. Rohrer
John P. Rosser
Thomas F. Sashihara
Jean and R. Ted Scharenberg
Robert H. Schmidt
Mayer Schwartz
Ralph W. Safor
Dale B. Shull
Theodore R. Smith
Charles E. Spencer
William H. Sprout
Edward C. Staehling
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E. H. Strobel
Gordon J. Taylor
William F. Taylor
Ronald W. Thompson
Augustus R. Van Kleeck
William J. Verross
A. H. Vilbrandt
Edwin F. Vogel
Darryl J. Von Lehmden
N. A. Voss
F. Morgan Warzel
Hyman H. Weinberg
Thomas A. Weiss
Claude W. White
Marion P. Wiant
George H. Wilkinson
James H. Wilson
Chester M. Wolcott
George J. Wrasmann
Theron H. Wright
Albert Zier
Paul H. Young

MOVING INTO THE NEW BUILDING

The problem of dismantling the equipment in the old building (McPherson Chemical Laboratory) and moving it into the new and setting it up. Professional movers quoted a price of at least $100,000 and possibly $200,000 to do this. It was decided that the students in the Unit Operations Lab, Summer 1959 would do the moving. Two weeks was allocated for this. The following pages give photographs of the moving and also the plan of attack on moving. This tremendous job was completed with only one minor accident. Moving and setting up of equipment was supervised by J. H. Koffolt, Dr. Haering, and Professor Chase. Dr. Haering carried the heaviest load. In the appendix of this report is given photographs of the staff in 1959 and of the equipment in McPherson Chemical Laboratories.

The following is a list of students who participated in the moving and setting up and also the graduate assistants who supervised the setting up.

Clay, D. R.
Davis, J. H.
Fasig, E. W.
Gruebmeyer, O.W.
Howard, G. R.
Kanyok, J.
Kukjazada, F. A.
McAteer, P. J.
Nester, J. F.
Ng, S.
Oates, K. L.
Weinstock, I.
Wing, L. E.
Sonawala, S. K.
Hammon, J.

Anderson, V. L.
Brauer, D. A.
Brooks, C. E.
Brown, P. W.
Dewey, R. C.
Estill, J. O.
Gieseke, W. D.
Hall, R. D.
Heckman, D. H.
Jones, D. L.
Kremblas, F. T.
Kurtz, K. D.
McAdams, W. E.
Ernst, W. R.

Marshall, M. H.
Mathias, D. F.
Mercer, T. M.
Moyer, R. M.
Ohler, J. L.
Perkins, R. A.
Schaller, A. L.
Seugling, E. W.
Shilling, G. T.
Smith, C. R.
Taylor, H. E.
White, E. L.
Wilt, R. L.
Withrow, J. L.

The Ohio State University

Chemical Engineering 741 - 880

PROBLEM 3M. OPERATIONS DISMANTLE - MOVE - ASSEMBLE - PUT IN FIRST CLASS OPERATION

This problem will begin Monday, July 13th, and will end Friday July 24th, at 5:00 p.m. Each member of this class is expected to spend a total of 44 actual hours on this project. Anyone missing a part or a whole day of this project will be expected to make this time up after July 24th.

This will be a privilege and opportunity to learn much about the practical phases of chemical engineering. A bronze plaque will be mounted in the Unit Operations Laboratory giving the names of all who did so well. A photograph of the group will be taken, framed and hung above the plaque to commemorate these memorable two weeks.

The assignment is given below. If it should develop that a group completes its assignment early (which will be true in many cases) other assignments will be made.

In case of questions consult the undersigned, Ed Haering, Bob Chase, and Kelly Latham in the order named.

Each man will be a foreman for two days. It will then rotate to the next man, etc., repeating until the 24th.

The plan of attack will be as follows: -

1: Bob Heaston will explain the model to you and will explain where the equipment will be erected in the new building.

2: Bob Heaston will also direct his squad to layout in the new building, on the floor, and with chalk, the plan view of the equipment.

3: Monday morning get your squad together study the equipment to be dismantled. Label with masking tape and suitable notations the various parts of the equipment.

4: Make a sketch of the equipment showing all piping details.

5: Prepare a plan of attack and submit a report to the instructor in charge how you intend to dismantle the equipment. This report will be approved by him, the undersigned and/or Ed Haering.

6: In dismantling the equipment move the instrument panel intact to the new building without taking off the instruments. This will be a delicate job.

7: Equipment that can be handled by the truck manned by Kelly can be moved to the floor where the equipment will be eventually installed.

8: For heavy equipment as the evaporator, dryer, etc., will be moved by professional movers as the Edwards Company.

9: After the equipment is moved consult with your instructor and the undersigned concerning changes to be made. For example, the Ansonia Still will be put on a higher base there will be more space between the downcomer from the bottom plate to the still kettle, and if possible the reflux and distillate will flow by gravity instead of using pumps. There will be changes with other pieces of equipment.

10: After the equipment is set up it is to be tested and a performance run made on it. It must be in first class working order.

11: It is hoped to have hard hats by the middle of the week of July 13th. These together with safety glasses must be worn at all times.

The assignments are: -

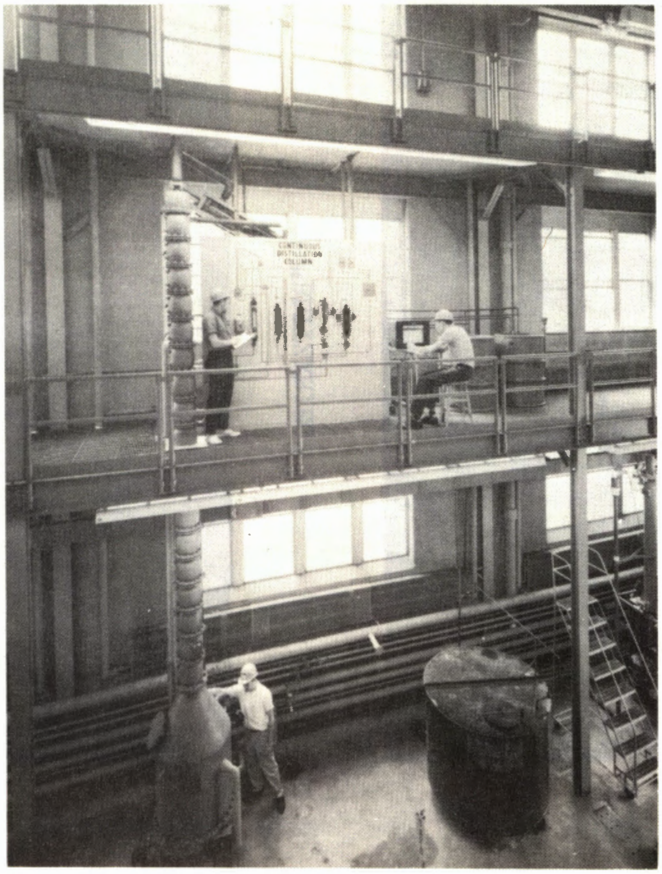
Squad No.	Assignment	Foreman July 13	Instructor in charge -
Special	Location of equipment in New Building Kukjazada, Sonawala, Stewart, VonLehmden.	Kukjazada	Heaston
1.	Filtration Equipment and Tanks.	Oates	Heaston
2.	Ansonia Still	Howard	Skaates
3.	Glass Walled Still - 3 plate and Packed Tower -	Kanyok	Carpenter
4. and 5.	Simon's Dryer, Dryden Dryer, Vacuum Dryer, Portable Dryers	Dewey Shilling	Haering
6.	Evaporator pumps, tanks, instrument board scales	Kremblas	Chase
7.	Liquid-Liquid Extraction - Ammonia Column Podbielniak Extractor	Brauer	Leverett
8.	Evaporator	Smith	Latham - Chase

<u>Squads to be Assigned Later</u>

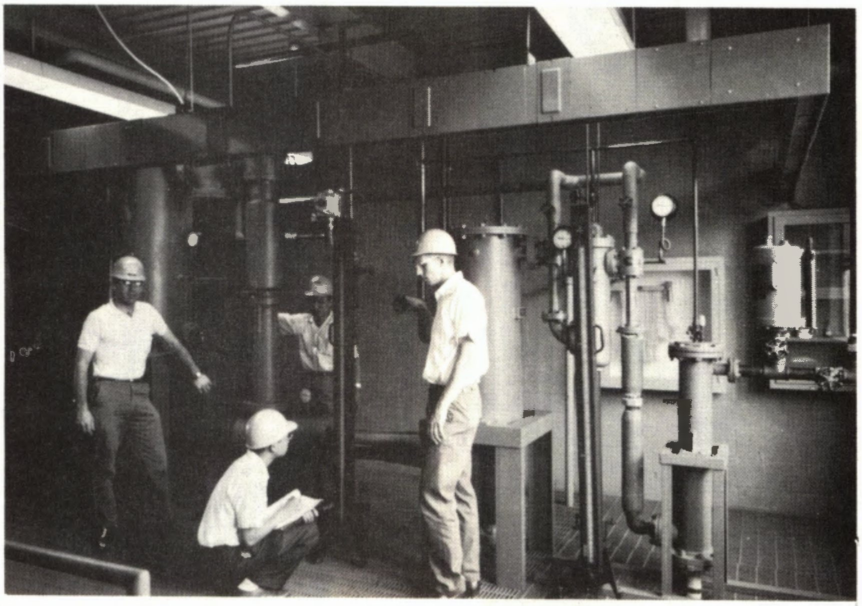
______	Heat Transfer and Fluid Flow	Stahel
______	Crushing and Grinding	Todd
______	Hydraulic Press, Centrifuge	Todd
______	Humidification Tower	Stahel
______	Podbielniak low and high temperature still	Skaates
______	ASTM Equipment	Breining
______	Optical Analysis Equipment - Microscopes, spectrophotometers, interferometers, etc.	Stahel

Squads to be Assigned Later (Continued)

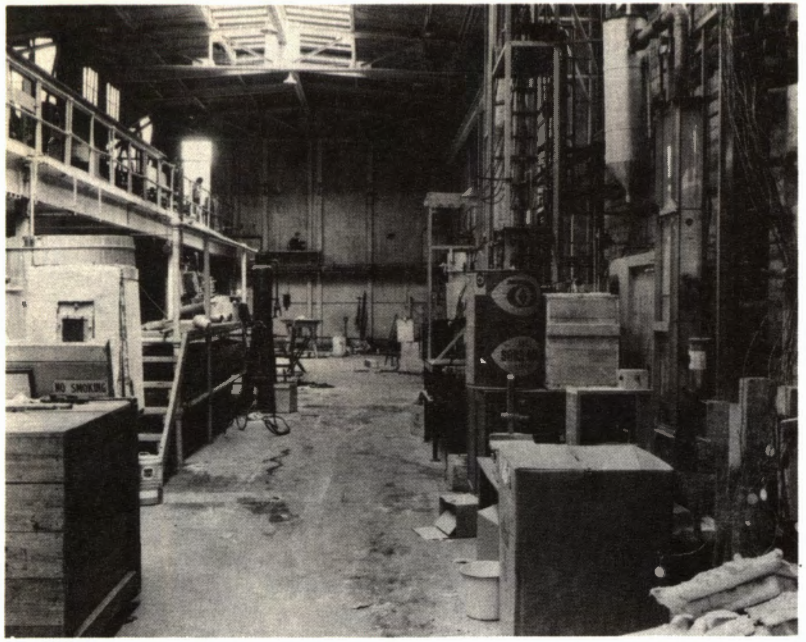
______	Distillation Testing Equipment	Leverett
______	Office Equipment	Breining
______	Steam Jacketed Kettles	Heaston
______	Instruments - Ch.E. 740	Chase
______	155-B - Equipment	Carpenter
______	Duncan's and Garrett's Packed Column	Skaates
______	Dialysis - Electrodryer - Dryden's Panel Board	Haering
______	Machine Shop	Latham and Breining
______	Miscellaneous Equipment Room 152 and Room 152 Annex	Breining
______	Room 154	Breining
______	Miscellaneous Equipment Room 155b - 156	Latham



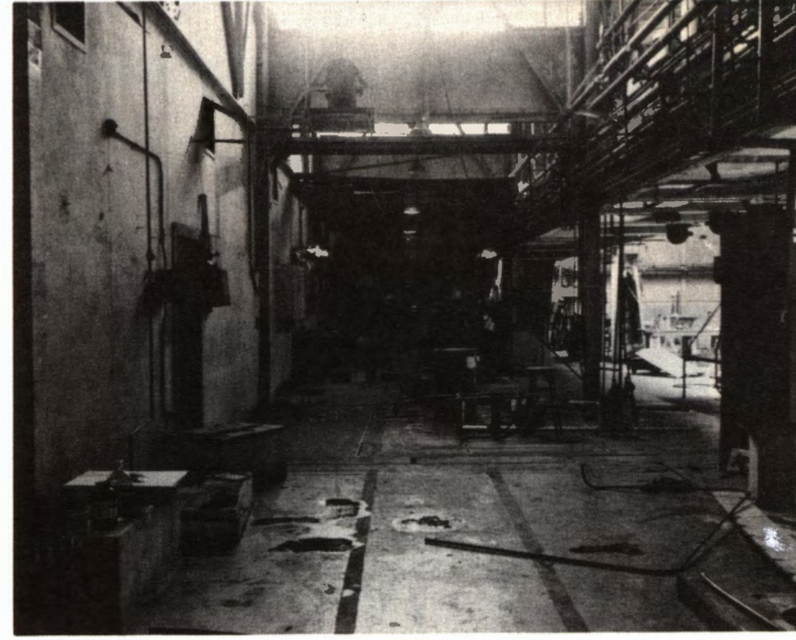
Thirty-Five Plate Continuous Plate Column Distillation Unit



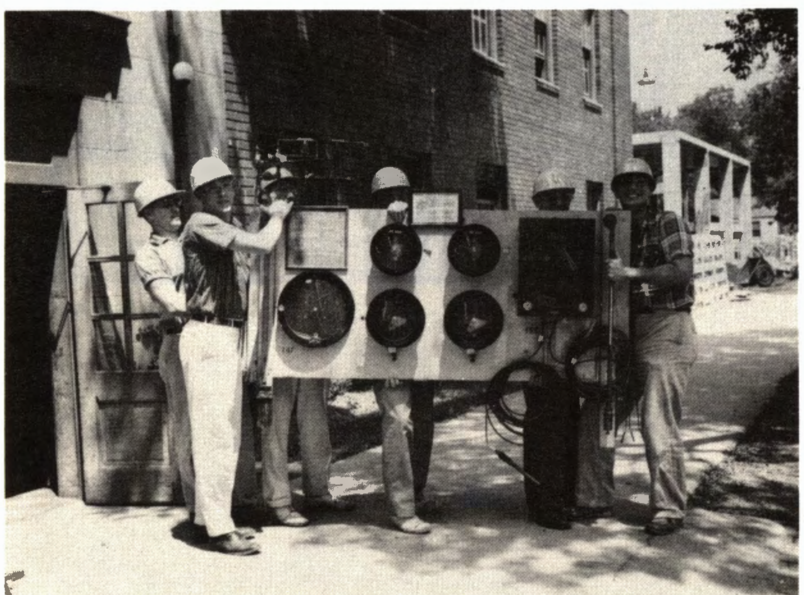
Twenty-Four Inch Chill Tank and Four-Stage Evactor



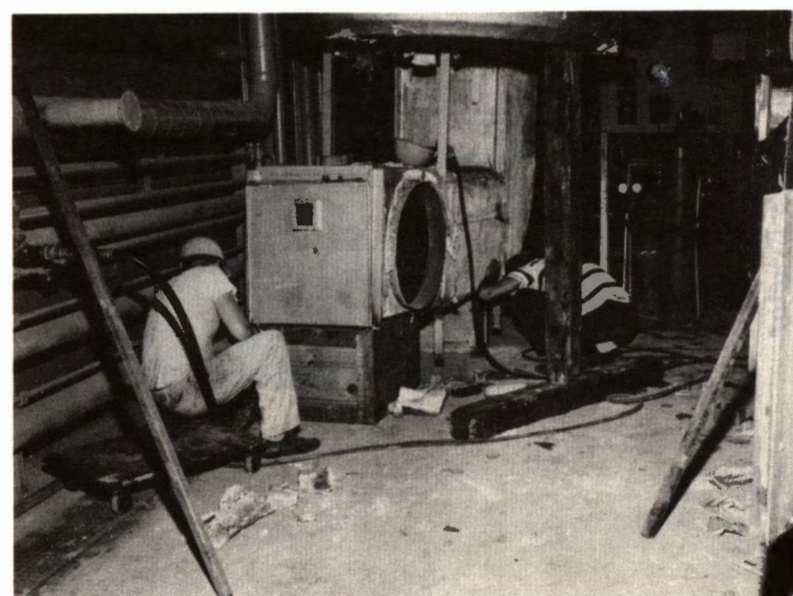
"BLITZKRIEG"



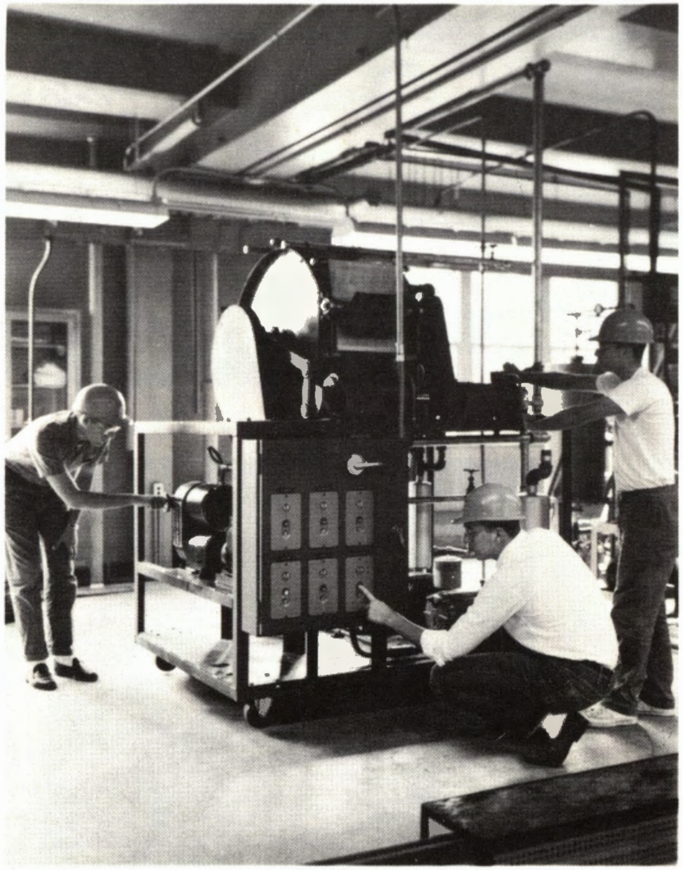
"THE GRAPES OF WRATH"



"HEAVE-HO AND THE WAY WE GO"

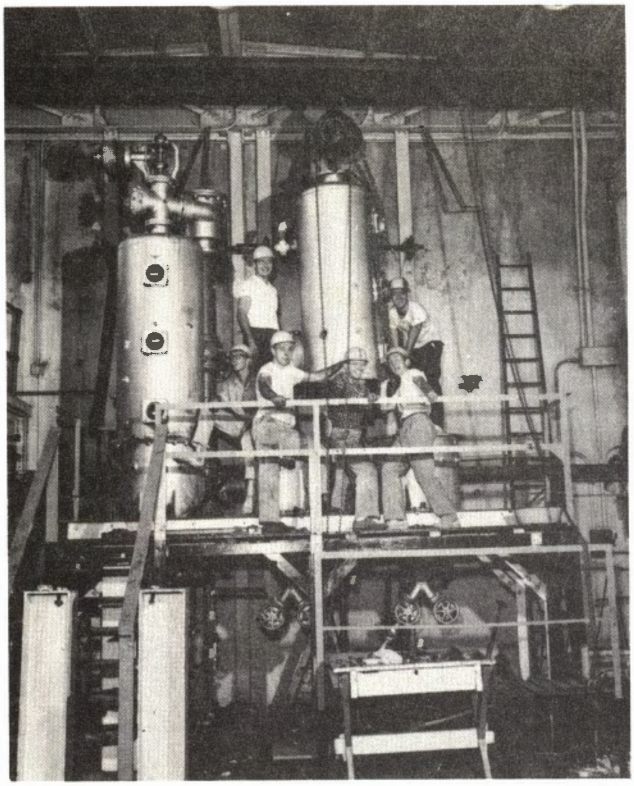


"H. P. SIMONS - WE NEED YOU - WHAT DOES THE COLLAR BONE CONNECT TO?"

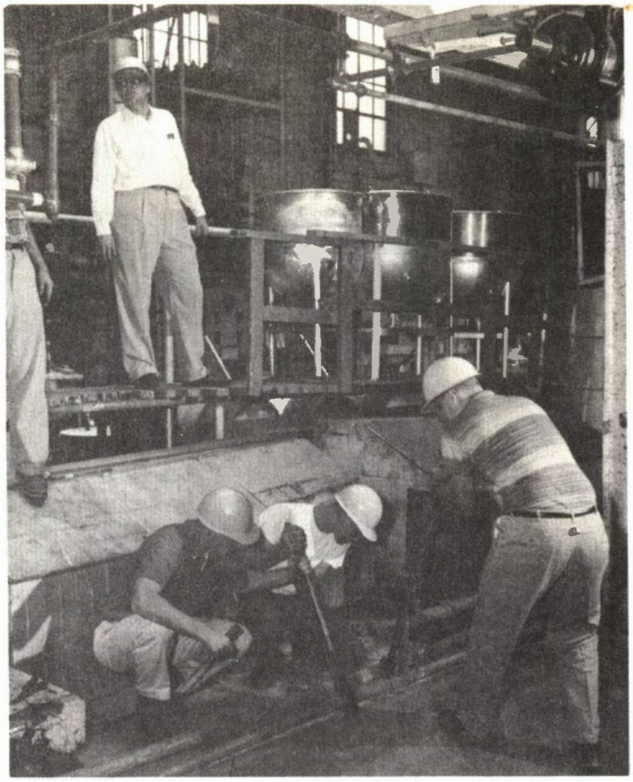


Three-Feet Diameter Continuous Rotary Filter

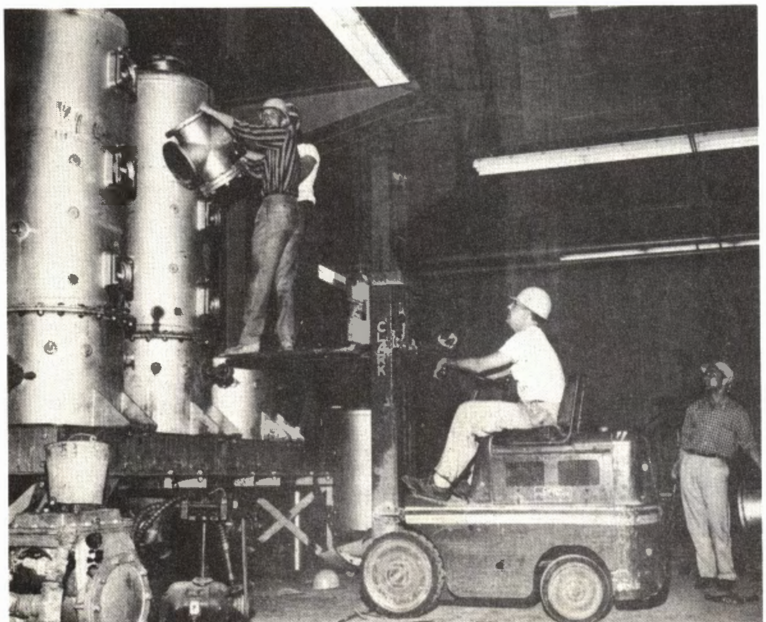
Unit Operations Laboratory



"AND THE EVAPORATOR CAME TUMBLING DOWN"



"ADMIRAL" BOSS HAERING GIVING ORDERS TO HIS GOBS FROM THE POOP DECK.



THE EVAPORATOR RISES AGAIN. IT WILL NOT FADE AWAY.

"GET THE MOP BUCKET AND CLEAN UP THE LIQUID-LIQUID EXTRACTION UNIT GOING UP."

CHEMICAL ENGINEERING INSPECTION TRIPS

The Chemical Engineering Inspection trips go back to 1907 one year after Dr. James R. Withrow came to Ohio State to head up the Industrial Chemical Division and the Chemical Engineering Department. At that time it was very difficult to visit many plants. This was due to the secrecy in the chemistry industry.

For several years there were two trips of a weeks duration, the western trip to Dayton; Miamisburg; Cincinnati; Chicago, Argo, Illinois; Midland and Detroit, Michigan.

The eastern trip consisted of Ritman, Akron, and Cleveland, Ohio; Buffalo, Niagra Falls, and Rochester, New York, and a trip to Linden, Graselli, New Jersey, the DuPont Company Chambers Works, Deep Water Point, and Baltimore, Maryland. In the 1950's due to train scheduling, cost of transportation resulted in organizing a Northern and Southern Inspection trip.

The southern inspection trip consisted of visits to Cincinnati; South Charleston, West Virginia (Belle); Parkersburg, Willow Island, West Virginia, and U. S. Steel - Clairton Works in Clairton, Pennsylvania.

The northern trip consisted of visits to plants to Barberton, Akron Painesville, Avon Lake, and Toledo, Ohio; Midland and Detroit, Michigan.

In the 1930's the number of plants visited was about 39 which resulted in an exhausted student body. In the 1950's the number of plants was reduced from seven to ten.

There were also other inspection trips which have been abandoned due to the interference with other classes. The Northwestern trip consisted of trips to Findlay, Fostoria, Ohio, and Blissfield, Pennsylvania. These trips were taken during the Beach-Sugar campaign.

There was another three day trip to Nitro and South Charleston, West Virginia, Ashland, Kentucky; by products plant of Solvay in Ironton, Ohio and the Mead Corporation in Chillicothe.

Copies of the inspection trip booklet are included in this history.

DEPARTMENT CHAIRMAN

The following were and are department Chairman of Chemical Engineering.

Dr. James R. Withrow who from 1906 to October 1, 1924 headed up the Industrial Chemical Division and the Chemical Engineering Division of the Department of Chemistry. In 1924 Chemical Engineering split from the Chemistry Department. Dr. Withrow was chairman from 1925-1948.

Joseph H. Koffolt was chairman of Chemical Engineering from 1948-1968.

Dr. Aldrich Syverson was appointed associate chairman in 1967 and chairman in 1968.

The
OHIO STATE UNIVERSITY

DEPARTMENT OF
CHEMICAL ENGINEERING

FIFTY-THIRD ANNUAL

CHEMICAL ENGINEERING INSPECTION TRIP

CHEMICAL ENGINEERING 704
NORTHERN INSPECTION TRIP

MARCH 23-MARCH 27, 1964

PUBLISHED BY THE UNIVERSITY AT COLUMBUS

THE OHIO STATE UNIVERSITY

The Ohio State University, located in Columbus, is a part of the public educational facilities maintained by the State. It comprises ten colleges and a graduate school.

The College of Agriculture and Home Economics
The College of Arts and Sciences
The College of Commerce and Administration
The College of Dentistry
The College of Education
The College of Engineering
The College of Law
The College of Medicine
The College of Pharmacy
The College of Veterinary Medicine
The Graduate School

This bulletin is devoted exclusively to the itinerary of the Northern Inspection Trip for Chemical Engineering students, required of all fourth year students in the Chemical Engineering curriculum, being Chemical Engineering Course No. 704.

OBJECT. These trips are intended to give to the chemical engineering student some practical knowledge of the magnitude of modern chemical engineering industrial operations from a selected variety of examples, and to give a practical opportunity for acquaintance with the different branches of the profession of chemical engineering in proper perspective, and to furnish training in observation, report writing, and discussion. They are strictly educational and are required for graduation in Chemical Engineering.

The detailed instructions herein are vital to acquirement of the maximum educational opportunities of the trips, though these details are incidental or **merely the usual common sense required by experience in organized effort.** On this trip remember at all times **you** represent the **Department of Chemical Engineering, The Ohio State University.**

MARCH 23-27, 1964

NORTHERN INSPECTION TRIP

IN ALL MATTERS OF DOUBT IN REGARD TO ITINERARY, CONSULT DIRECTOR IN CHARGE.

This bulletin gives in detail the advice, instructions, itinerary, etc., of the Fifty-third Annual Inspection Trip of Chemical Engineering students conducted by the Department of Chemical Engineering of The Ohio State University.

GENERAL INSTRUCTIONS. Due to the strenuous nature of the schedule, each man should conserve his strength as much as possible and get plenty of **rest and sleep each night.** This is **not a pleasure trip,** but a serious effort to obtain infomation at first hand, of the technical application of chemistry and engineering in chemical manufacturing enterprises.

Travel light, with small handbag, because of tedious carry at different points. Include a light- or medium-weight overcoat because of weather variability in lake cities. Wear well-fitting **previously worn shoes** which you have found are easy on your feet under walking conditions. **Open mesh, porous, high heeled, crepe soled, rubber soled, and heel and toe plate shoes are not allowed in most chemical plants. Do not come on trip with new shoes.** Start the trip in **prime physical condition.**

Safety goggles and **safety hard hats** will be **furnished** each member of the party. Wear them in every plant.

Wear your official inspection badge in plants and when boarding busses.

Promptness in all appointments is absolutely essential because the companies have been notified that visits will be made at certain specified times. Members not staying at the hotels must notify **the assistant trip director,** and the **proper squad captain** not later than the previous day of the point at which they will join the party so that an unnecessary search will not be made for them. They must adjust their schedules so as to be on hand at the appointed stations or plants exactly on time. **If** you should be either early or late, stay **out of the plant** so as not to annoy its officers.

Hotel Bills. Each man must pay his own hotel bill before checking out. He is responsible for his own luggage. Accidental omission of paying for hotel and meals looks bad for the University and hurts its good name. **Report payment of hotel bill to your squad captain before party's departure from hotel.** The squad captain will report to the financial assistant.

Attendance. A roll of attendance will be kept for each item of the itinerary. No one is excused from any portion of trip or from a conference unless previous arrangement **in writing** has been made.

Plant Inspection. On arrival at each plant, squads will form IMMEDIATELY and these divisions must be strictly maintained throughout the round of the plant. DO NOT STRAGGLE BEHIND: it causes annoyance of the guides and other employees. Ask all the questions you desire. Notes should be taken, whenever possible, and when not forbidden by desire of the company. Such a desire, if made known, must be respected. Notes are to be written up more fully in the evenings. **PHOTOGRAPHS MUST NOT BE TAKEN AT ANY PLANT.** Under no consideration may **cameras be taken into plants. Leave all cameras in busses at your own risk.** *Leave matches and lighters in busses. Smoking on plant premises is prohibited.*

Walk on the left side of plant roads, facing traffic unless sidewalks are provided or unless specifically directed otherwise.

Keep out of the way of workmen. Do not obstruct operations. **Please do not question the operators.** Annoyance of girl employees will not be tolerated. Influence on succeeding trips would be serious. Gentlemanly conduct is always necessary. Skylarking is dangerous to individuals and is always annoying to plant officers; it is forbidden at all times. Souvenir collecting is forbidden.

If party arrives at plant ahead of time, or there is delay in the time of a plant inspection, members of party should form into squads for group conference.

INFRACTIONS OF THESE INSTRUCTIONS WILL RESULT IN DISMISSAL FROM THE TRIP.

Plant Departure. To avoid the missing of connections and delay and annoyance to our hosts at the next plant, it is mandatory that **the departure schedule from each plant be maintained.** One squad staying **overtime** may disturb the **whole day's program.**

TRANSPORTATION ASSISTANTS. The squad captains will be under the supervision of a group transportation assistant to whom his squad is assigned, and as hereinafter indicated. The bus will also be under the supervision of a transportation assistant. The duties of these assistants shall be:

1. Report to Assistant Director as to the status of occupants of his bus after each plant visit and at all transportation starts.
2. Line up his squads in proper sequence before each plant visit.
3. Report to Assistant Director concerning the status of his squads in the mornings. They will be responsible for their squads at all times.
4. Receive reports from checking assistants concerning articles forgotten by the members. Report losses to Assistant Director.

SQUAD CAPTAINS. Each squad will be in charge of a captain. Members designated by heavy type in the squad assignments will serve as squad captains.

Squad captains will rotate from day to day. For example, the first member of a squad will be squad captain the first day, the second member the second day, etc.

If a particular squad captain cannot be available for duty on his day, he should make arrangements with another member of his squad and report this change to his transportation assistant.

The captain is responsible at all times for keeping his squad intact. Squad captains shall keep squads as near the directors and guides as possible, and prevent straggling by bringing up the rear of their squads. At plants where a number of guides are furnished, it will help the guides of the various parties, and it will therefore be **the duty of each squad captain** to see as his party starts that the **guide understands the time of terminating** the visit so that he may divide his time accordingly. The squad **captain shall** also **notify the guide five minutes before** the departure time that the time of departure has arrived.

Captains shall report to **special transportation assistant** in charge of his squad **immediately after** each visit and before the next move as to the status of his squad. They will assign to the members of their squads different parts of topics upon which they will report as the squad captain sees fit. Before leaving each city squad captains must report to the special transportation assistant in charge of his squad, the status of his squad as concerns payment of hotel bills, etc.

Each member of a squad is required to remain with his squad on all transportation moves, and other complicated movements of the party; each squad captain is charged with seeing that he has all members of his squad with him when the party makes a move.

While on the trip, in order to protect the party against late sleepers and failures of callers to call individuals, squad captains will report to their transportation assistant immediately upon being called in the morning, and will require members of their squad to similarly report to them. The transportation assistants will report to the Assistant Director. The necessary informaion regarding room numbers will be obtained the evening before. **No squad captain shall go to breakfast until he knows that every member of his squad is awake.**

To avoid confusion and expedite securing of keys, members of party will line up in single file, at key clerk's desk, by squads and in numerical order. The Assistant Director will obtain and distribute keys. For those doubling up in hotel rooms, roommate with lowest number will obtain key, while others will drop out of line. See mimeographed sheets for details.

REPORTS. Written reports on standard 8½- by 11-inch note paper with covers are required. Reports must be brief, and be specified additions to your general knowledge, and quantitative where possible. They will be submitted in dittoed form so that each member of the party will have a copy.

Final reports shall be submitted by squads, and not by individuals. Each plant shall be a complete report covering the points of view given below. The squad captain of the day will assign each member of his squad his particular specific assignment. There will be an examination, as indicated later in this bulletin, on all plants visited. Squads will be expected to have conferences among themselves to discuss in detail each plant visited and all the points of view. Each member of the squad is expected to avail himself of every opportunity of acquiring first hand information of all points of view. The squads will submit a final report containing a report on each plant in the standard report cover. The squad captain of the day will be responsible for the final compilation of the plants visited that day. He will make assignments to members of his squad. He will also submit a report grading each member of the squad. See mimeographed sheet for details.

Points of View or Organization of Plant Reports

I. *Market Demand and Economics: Finished Products:* Specifications; Output, Uses of products produced. Suggestions of other uses of these products.

II. *Chemistry or Process:* Simplified reactions; Quantities involved; Data; Flow sheet. Suggestions of uses and possible markets of by-products.

III. *Chemical Engineering Operations:* Operating data; Performance; Material and power consumption; Flow sheet; Principle and operation. Suggestions of other chemical engineering operations which might be used and reasons.

IV. *Instrumentation:* Types of instruments, as indicating, recording, and controlling; Reasons for selection; Principles and operations. Suggestions of additional or alternative instrumentation, giving reasons.

V. *Machines or Equipment:* Types in use; Name plate references; List of special machinery; Capacities and performance; Distinctive features of this plant. Suggestions with reasons of alternative equipment or machines to increase efficiency or production.

VI. *Units Operated:* Power per unit; Reason for subdivision into units; Capacities. Suggestions with reasons for changing the units operated or the process to bring about increased efficiency, increased production, or lowered cost.

VII. *Plant Control:* Points in the process where tests are made. Methods of testing and special laboratory testing devices; Checking operations. Suggestions with reasons for additional plant control.

VIII. *Organization Chart and Personnel:* Types; Supply; Turnover. Suggestions with reasons for any change.

IX. a. *Engineering materials of construction* utilized in the plant, with reasons for their use, and suggestions as to the advantageous use of other materials, such as Duriron, Rubber Lined Equipment, Alloys, Plastics, and Pyrex, with reasons for your suggestions.

b. *Plant and laboratory equipment* which could be used or modified for use in the laboratories of Chemical Engineering at The Ohio State University, pointing out what will be illustrated or taught thereby or how usefull as a basis of investigation.

X. a. *Property and Accident Hazards:* Existence of the Hazards in plant, and precautionary measures employed.

b. *Personnel—Welfare.* Recreation; Sanitation; First Aid; Employees' comfort such as Rest Rooms, Cafeterias, Drinking Fountains, etc.

c. *Suggestions* which should be incorporated in the Chemical Engineering Laboratories of Ohio State University.

d. *Color codes* to designate equipment, pipe lines, safety devices, etc.

XI. *The name and plant title of your guide.*

The **final grade** in this course will be evaluated on the following basis:

1. Participation in the inspection trip......	25%
2. Group Report..........................	25%
3. Personal Characteristics.................	10%
4. Squad Foreman's Report.................	10%
5. Written Examination on the Trip.........	30%
	100%

SPECIAL STAFF ASSISTANTS

James Knox, General Transportation Assistant. In charge of receiving all reports from Transportation Assistants and in charge of all squads on all movements, especially squad organization prior to visiting the plant. Messrs. **Veazie** and **Arnold** will work with **James Knox** as indicated below. It will be noted that there will be only one bus on all movements. The General Transportation Assistant will also be the liaison man between the Director and the party.

Gary Croskey and **Larry Perkins.** Financial Assistants. In charge of checking on the payment of hotel bills. Squad captains will report to **Gary Croskey.** They will also check on the payment of gratiuities for porters, waitresses, etc. **Larry Perkins** will prepare financial report of gratuities.

William Kerns and Paul Schmitz, Checking Assistants. They will check the number of bags at the various transfer points on the trip, and especially in the cases where the baggage is handled by transfer companies. They will report to the Assistant Director concerning the status at the end of each transportation move.

Fredric Arnold, Transportation Assistant, in charge of Bus. In Charge of squads **I** and **II.**

R. M. Veazie, Transportation Assistant, in charge of squads **III, IV** and **V.**

J. M. Davidson, C. R. Anderson, E. N. Wheeler, C. E. Baumann, R. J. Rundt, D. J. Stazenski, S. K. Sonawala, W. Azbell, B. Yao, and **R. Magley,** Log Assistants. They will submit a detailed log of entire inspection trip. They will also confer with trouble shooters and recommend changes in inspection trip bulletin material. The report of the cartographers will also be included in their report.

R. Evanko, W. A. Smith, T. W. Doub, F. J. Rerko, and **T. C. McKelvey,** Photograph Record Assistants, will have charge of organizing and mounting photographs taken on the trip. They will also arrange for a group photograph of the group. **T. W. Doub** will have the responsibility of the final presentation of the photographs for framing and permanent display.

R. Betchel, O. L. Davies, L. W. Perkins, D. Walter, and **J. Weaver,** Trouble Shooters, will submit a report concerning suggested changes which could be made in future trips in regard to arrangements, as transportation, details of plant visitation, and also anything from point of view of betterment of trip. These men will receive complaints, if any, as to service and otherwise. They will also appreciate memoranda suggestions for betterment. **O. L. Davies** will submit the report.

J. P. Gegner, F. H. Flor, M. C. Royer, V. L. DePaola, and **F. Helmi,** Cartographers. A report will be submitted by this group indicating the **exact route** followed on this trip. They also will suggest better routes which should be followed on future trips. **V. L. DePaola** will be in charge of the organization. This report will be included in the log assistants' report. They will receive suggestions from members of the party.

D. Pachko, Report Assistant, in charge of distribution of master ditto sheets. Each squad captain should make an appointment with **D. Pachko** to obtain instruction concerning operation of Ditto Machine.

SQUAD ASSIGNMENTS

Squad I

1. Anderson, E. R.
6. Croskey, G.
11. Evanko, R.
16. Knox, J.
20. Perkins, L.
25. Schmitz, P.
30. Walter, D.

Squad II

2. Arnold, F. C.
7. Davidson, J. M.
12. Flor, F. H.
17. Magley, R.
21. Perkins, L. W.
26. Smith, W. A.
31. Weaver, J.

Squad III

3. Azbell, W.
8. Davies, O. L.
13. Gegner, J. P.
22. Rerko, F. J.
27. Sonawala, S. K.
32. Wheeler, E. N.
35. Yao, B.

Squad IV

4. Baumann, C. E.
9. DePaolo, V. L.
14. Helmi, F.
18. McKelvey, T. C.
23. Royer, M. C.
28. Stazenski, D. J.

Squad V

5. Betschel, R.
10. Doub, T. W.
15. Kerns, W.
19. Pachko, D.
24. Rundt, R. J.
29. Veazie, R. M.

FIFTY-THIRD ANNUAL
INSPECTION TRIP FOR CHEMICAL ENGINEERS

NORTHERN TRIP
Ohio State University, 1964

MONDAY, MARCH 23, 1964

6:10 a.m. (E.T.)—Assemble at southwest corridor entrance of Chemical Engineering Building, by squads. Squad captains report to their Transportation Assistant who will report to Assistant Director.

6:20 a.m.—Board special bus of the Lake Shore Lines. There will be one bus.

6:30 a.m.—Leave University grounds, via 15th Ave., turn north onto Fourth St. to 17th Ave., turn right onto 17th and follow 17th Ave. to Interstate 71. Follow Interstate 71 to U. S. Route 224. Turn right and follow Route 224 to Barberton, Ohio. In Barberton turn right onto U. S. Route 21, left onto Ohio Route 5, which becomes Wooster Rd., continue on Wooster Rd., turn right on Columbia Ct.

9:00 a.m. (E.T.)—Arrive and visit plant of

(I) CHEMICAL DIVISION—PITTSBURGH PLATE GLASS COMPANY

The Chemical Division of the Pittsburgh Plate Glass Company is a leading producer of basic chemicals, serving a widely diversified group of industries. Formerly known as the Columbia-Southern Chemical Corporation, it was founded in 1899 at Barberton, Ohio as one of America's first producers of soda ash.

Today, PPG Chemical Division operations span the country. Growth and expansion have increased the number of plants to nine and broadened the product line to include: soda ash, caustic soda, chlorine, silica pigments, cement, hydrogen peroxide, calcium chloride, perchlorethylene, trichlorethylene, carbon tetrachloride, calcium hyprochlorite, and others.

Barberton's Chemical Division research laboratories recently received wide recognition for their CR-39 resin, which was used in the periscope lenses of the mercury capsules that made America's recent space flights.

The Barberton Plant covers 2700 acres and employs over 2000 persons. In addition to its chemical units, its operations also include a multi-million dollar cement plant and the deepest limestone mine in the world. Barberton's production facilities feature high tonnage chemical operations; soda ash by the ammonia soda process; electrolytic chlorine and caustic production; unit operations including evaporation, filtration, and distillation; modern open rack and refinery construction units.

12:15 p. m. (E.T.)—Leave plant. Board bus for Akron, Ohio. Follow Wooster Rd. (eastbound), turn right on U. S. 224, turn left on Ohio 241, turn left on Market St.

1:00 p.m. (E.T.)—Arrive at Goodyear Hall on E. Market St. and park bus in reserved space at main entrance.

(II) THE GOODYEAR TIRE AND RUBBER COMPANY

DIVISIONS: Tires, Tubes and Repair Materials; Industrial Products; Chemical Products; Films and Flooring; Shoe Products; Foam Products; Aviation Products; Goodyear Aerospace Corporation; Goodyear International; International Chemical Division.

1:00 p.m.—*Luncheon, The Brown Derby, E. Market St., guests of Goodyear.* Hard hats and safety goggles may be left in bus as no department will be visited where they are necessary.

1:45 p.m.—Rubber Exhibit, Goodyear Hall, displays of products of all Divisions with special attention and explanation of a scale model of synthetic rubber production unit.

2:30 p.m.—Board Bus to Plant 2 to follow the "Tire Cycle"; breakdown and milling of crude rubber, natural synthetic; compounding with carbon black, plasticizers and accelerators; processing of Nylon and Rayon tire fabrics; bead building; tread extrusion; tire building, curing and final inspection.

3:30 p.m.—Board bus at Plant 2 for Goodyear Research Bldg.

3:35 p.m.—Tour of Goodyear Research conducted by Dr. H. A. Pace and Mr. Paul Ginnings. Tour will cover plastics processing, general research laboratories, radiation laboratory, library, etc.

4:30 p.m.—Board bus in front of Research, return to E. Market St. and turn right. Continue on E. Market and W. Market across Akron, approximately 11 miles, turn right on Route 176. After 2 miles take cloverleaf entrance to U. S. 21 on the right.

Enter Cleveland via Willow Freeway, left on Broadway, right on E. 9th St., right on Chester Ave., to E. 13th St.

6:15 p. m. (E. T.)—Arrive at

THE MANGER HOTEL

E. 13th St. and Chester Ave. Obtain room assigned and keys. Read mimeographed instructions concerning obtaining keys. Dine at your convenience.

IMPORTANT NOTICE CONCERNING HOTEL CHECK OUT

Due to crowded hotel conditions it will be necessary to pay hotel bills by Tuesday morning by 6:30 a.m. We urge that you pay your *hotel bill Monday night.* Failure to pay your hotel bill by 6:30 a.m. Tuesday morning will necessitate paying for your room for two days instead of one.

TUESDAY, MARCH 24, 1964

6:00 a. m. (E. T.)—Rising call.

6:05 a.m. (E. T.)—Squad captains assure themselves members of their squads are well on their way, and report to their Transportation Assistant, who will report to Assistant Director. *Your hotel bill must be paid before leaving Tuesday morning.* Report payment of your hotel bill to your captain.

6:15 a.m. (E.T.)—Breakfast. Hotel Coffee Shop or restaurants in the vicinity.

6:50 a.m. (E.T.)—Assemble in hotel lobby by squads **with your baggage**. Squad Captains report. Board special bus of the Lake Shore Lines.

7:00 a.m. (E.T.)—Bus leaves the hotel, on Chester Ave., turn right on E. 9th, and right on Cleveland Memorial Shoreway. Follow Ohio Route 2 to Painesville, turn right to U. S. Route 20. Follow U. S. Route 20 through Painesville. About 3 miles outside Painesville turn left on Bowhall Rd.

8:15 a.m. (E.T.)—Arrive and visit plant of

(III) INDUSTRIAL RAYON DIVISION
Midland-Ross Corporation
Painesville, Ohio

Manufacturer of Tyrex rayon tire yarn, cord and fabric; Tyweld adhesive-treated yarn; rayon textile yarn and polyester tire cord. Viscose rayon continuous spinning process. Ply and cord twisting, coning, warping and weaving. Evaporation, Crystallization, Dehydration, Dialysis, water softening, steam generation, refrigeration, etc. Briefing of plant trip, film, inspection of plant, and question period.

12:00 noon (E.T.)—*Luncheon. Cafeteria, guests of the Industrial Rayon.*

1:00 p.m. (E.T.)—Leave cafeteria, board bus for Avon Lake. Retrace route to downtown Cleveland, remain on Ohio Route 2 past Rocky River and Bay Village, Ohio to Avon Lake. Turn left on Moore Rd., right on Walker Rd.

2:45 p.m. (E.T.)—Arrive at and visit the plant of

(IV) B. F. GOODRICH CHEMICAL COMPANY
Avon Lake Development Center

B. F. Goodrich Chemical Company is one of nine operating divisions of The B. F. Goodrich Company. The parent company, which was founded in 1870 and employs approximately 40,000 people, is a diversified corporation encompassing manufacturing operations in the areas of rubber, chemicals, plastics, metals and textiles.

The Chemical Company was established as a separate division in 1944 and manufactures Geon vinyl resins and plastics, Hycar special purpose rubbers, Estane polyurethane materials, Abson acrylonitrile-butadiene-stryene polymers, Good-rite rubber chemicals and Carbopol water-soluble resins.

These products are manufactured in seven domestic manufacturing plants as well as a number of affiliate or associate chemical facilities located in Europe, South America and the Far East.

The Avon Lake unit is a modern development center with facilities for new process and product development of the company. Process development facilities of micro-engineering scale, as well as semi-works scale, are used in the investigation of processes involving plastics and chemical products. Semi-works quantities of new products are produced here for product and market development.

The Company's Products Application Laboratory for the development of new uses for the Company's old and new products is located here.

4:45 p.m. (E.T.)—Leave plant, travel south on Ohio Route No. 76 to Ohio Turnpike, entering the Turnpike at Gate 9, North Olmsted and Cleveland Interchange. Follow Turnpike to Interchange No. 5, Stony Ridge-Toledo Interchange, follow Ohio Route 120 to Starr Ave., turn left on Starr Ave., bear right on Main St. over Cherry St. Bridge, turn left on Superior St.

6:45 p.m. (E.T.)—Arrive at

THE SECOR HOTEL

Jefferson Ave. at Superior St., obtain room assigned and keys. Read mimeographed instructions concerning keys. Dine at your convenience.

WEDNESDAY, MARCH 25, 1964

7:00 a.m. (E.T.)—Rising call.

7:15 a.m. (E.T.)—Squad Captains assure themselves that members of their squad are up and on their way; report to your transportation assistant.

7:30 a.m. (E.T.)—Breakfast, Hotel Coffee Shop or restaurants in the vicinity. Pay your hotel bill.

8:45 a.m. (E.T.)—Assemble in hotel lobby by squads. Squad Captains report.

9:00 a.m. (E.T.)—Board bus for trip to Sohio Refinery. Eastbound on Summit, right on Toledo Expressway, left on Consaul St., left on Otter Creek Rd., right on Cedar Point Rd.

(V) THE STANDARD OIL COMPANY (OHIO)

Toledo Refinery

In mid-1956 the decision was made to proceed with the detailed design of a new 60,000 BPSD integrated refinery at Toledo, Ohio. The design and construction of the plant were completed with start-up in October, 1958.

The Standard Oil Toledo Refinery differs from other conventional refineries in that it was planned and built as one complete operating unit. It is a completely integrated refining facility that utilizes the most advanced processes. The individual process units are hooked together under centralized control to create a straight through manufacturing plant unlike anything of this size built in the past.

The new refinery produces the high quality and complex fuels and lubricants required by the automobiles and aircraft of today and for years to come.

Program

9:30 a.m.—Introduction—I. L. Peterson

9:45 a.m.—Planning a Modern Refinery—D. L. Cawein

10:15 a.m.—Coffee Break

10:30 a.m.—Start-up and Operation of a Modern Refinery—G. G. Knepp

11:00 a.m.—Plant Tour

12:45 p.m.—*Luncheon—Refinery Cafeteria, guests of SOHIO.*

2:00 p.m.—Discussion

3:00 p.m.—Departure for Saginaw, Mich. Turn right on Cedar Point Rd., left on Otter Creek Rd., right on Consaul St., left on Front St., turn right on Toledo Expressway. Turn left on to U. S. 223 (Summit St.), right on to Monroe St., follow U. S. 223 to U. S. 23. Follow U. S. 23 to Saginaw, Mich.

6:00 p.m.—Arrive Saginaw, Mich., at

THE HOTEL BANCROFT

Procure baggage from bus. Follow mimeographed directions concerning obtaining room assignments and keys.

Evening open. Dine at your convenience.

THURSDAY, MARCH 26, 1964

5:45 a.m. (E.T.)—Rising call. Squad captains report to transportation assistants by telephone.

6:20 a.m. (E.T.)—Assemble in lobby by squads, **with your baggage.** Squad captains report to transportation assistants.

6:30 a.m. (E.T.)—Board chartered Lake Shore bus for Midland, Michigan. Travel north on U. S. Route 10 to Midland, turn left on to Mich. Route 20 to Dow Chemical.

7:15 a.m. (E.T.)—Arrive at the plant of the

(VI) DOW CHEMICAL COMPANY

The Dow Chemical Company organized in 1897 to make bleach from chlorine. The brine contained other chemicals, calcium, chlorine, bromine and magnesium, from which a profusion of products evolved.

An increasing number of products used directly by the consumers have recently taken their place along with the Industrial and Fine Chemicals that long have been the backbone of the company.

Plastics and an ever-growing number of agricultural chemicals are meeting the needs of the consumer market. The Dow Chemical Company's home plant at Midland now covers 4,500 acres, numbers over 700 buildings and has a payroll of over 10,000 employees.

The tour of the Ethanolamine facilities will cover raw materials, reactions, multi-effect distillation and train fraction to produce the product. Ethylene oxide, gaseous NH_3 and chlorine are the major chemicals involved.

The tour of the Plastics Development and Services Laboratories will cover a brief introduction to PD&S, followed by a laboratory tour. The tour will include: injection molding laboratory, vacuum forming laboratory, film and sheeting laboratory, extrusion laboratory, foam laboratory and testing laboratory. Demonstrations with equipment operating is planned.

HOST: Edward White—Production Economics B.Ch.E., Ohio State University, 1960; M.B.A., Ohio State University, 1961.

7:15 a.m.—*Breakfast at Dow Cafeteria, guests of Dow Chemical Company.*

8:15 a.m.—47 Building Auditorium—Dow welcome by Max Key, General Manager of the Midland Division.

8:30 a.m.—Description of the Ethanolamine Process by James Manston, Superintendent, and R. Hamilton, Process Engineering Services.

9:15 a.m.—Tour of the Ethanolamine Plant.

10:30 a.m.—Tour of the Plastics Development and Services Laboratories, conducted by Robert Webster and associates.

11:30 a.m.—Leave Dow Chemical Company for Dow Corning at Midland, Michigan.

11:45 a.m. (E.T.)—*Arrive at Cafeteria of Dow Corning for lunch as guests of the Dow Corning Corporation.*

(VII) DOW CORNING CORPORATION

Dow Corning Corporation, incorporated in 1943, pioneered in the field of silicones—a new family of chemicals which bridge the gap between organic and inorganic materials. The products produced are sold primarily to industrial users who utilize the unique properties of silicones in their final products. The materials themselves fall into three major classifications: fluids, resins, and rubber. Within these major groups there are now over 800 products for use as lubricants, dielectrics, water repellants, coatings, antifoams, adhesives, and hundreds of other applications. Dow Corning has its corporate headquarters in Midland, Michigan. In addition, production facilities are located in Hemlock, Michigan, Elizabethtown, Kentucky, and Greensboro, North Carolina.

1:00 p.m. (E.T.)—Briefing period followed by plant inspection.

4:00 p.m. (E.T.)—Board bus for Detroit, Michigan. Follow Interstate 75 to Eleven Mile Rd. In Detroit, bear right to Mich. Route 150, right on Eight Mile Rd., left on Woodward Ave., right on Davison, left on John Lodge Expressway, left on Woodward Ave., left on Michigan Ave.

7:00 p.m. (E.T.)—Arrive at

SHERATON-CADILLAC HOTEL

Register list will be presented to hotel clerk. Follow mimeographed instructions concerning obtaining keys. Get room assignments.

FRIDAY, MARCH 27, 1964

6:30 a.m. (E.T.)—Rising call. Squad captains report to Transportation Assistant by telephone. Breakfast out or in Hotel breakfast room.

7:45 a.m. (E.T.)—Assemble in Hotel lobby. Squad captains report to your transportation assistant who in turn will report to the Assistant Director.

7:50 a.m. (E.T.)—Board bus for Dearborn, Michigan, and Ford Central Office Building. West on Michigan Ave., right on Second St., left on Bagley Ave., right on Lodge Freeway, left on Ford Freeway, right on Michigan Ave., right on Southfield Freeway.

8:30 a.m. (E.T.)—Arrive at

(VIII) FORD MOTOR COMPANY
Rouge Plant

This plant covers 1200 acres and employs 40,000 men and women. Blast furnaces, dock, assembly lines, machine shops, foundry, coke ovens, open hearths, rolling mills and glass plant. Trip will include: 1. Orientation of Ford's research and engineering activities; 2. Discussion of Materials Application; 3. Visit to Fuel and Lubricants Laboratories; 4. Visit to the Material Development Laboratories.

12:30 p.m. (E.T.)—*Luncheon as guests of Ford Motor Company.*

1:30 p.m. (E.T.)—Leave Research and Engineering Center. Board bus for Columbus, Ohio. South on Southfield Freeway, right on Willow Run Freeway, left on U. S. Route 24, left on Interstate 75 to Toledo. Follow Interstate 280 through Toledo. Outside Toledo follow Ohio Route 120 to U. S. Route 20. Turn left and follow U. S. 20 to Ohio Route 199, turn right and follow Ohio Route 199 to Fostoria. At Fostoria pick up U. S. Route 23. Follow U. S. 23 to Columbus, Ohio.

6:15 p.m. (E.T.)—Arrive Chemical Engineering Building, The Ohio State University Campus.

Return hard hats and safety glasses to Mike Kukla on Monday, March 30.

Squad Captains will obtain "Ditto" master copies for their report from the Report Assistant.

WRITTEN REPORTS DUE THURSDAY, APRIL 23, 1964.

EXAMINATION ON THE TRIP THURSDAY, APRIL 23, 1964, 5:00 P.M., ROOM 207, CHEMICAL ENGINEERING BUILDING.

SUGGESTIONS FROM ANY POINT OF VIEW FOR THE BETTERMENT OF ANY FEATURE OF THE TRIP ARE REQUESTED.

TRIP IN CHARGE OF

JOSEPH H. KOFFOLT,
Chairman, Chemical Engineering Department

Assisted by:

E. R. HAERING
Instructor in Chemical Engineering

FOR HOTEL ARRANGEMENTS SEE MIMEOGRAPH SHEET.

EXPENSE ACCOUNT ESTIMATE*

	I	II
1. *Incidental*		
Fund (for baggage transfer, tips, etc.) in Director's care	$ 2.00	
2. *Bus Fare*		
Six day charter bus for entire trip.....	25.00	
3. *Meals*		
a. Cleveland (2)	3.00	4.50
b. Toledo (2)	3.00	4.50
c. Saginaw (1)	1.50	3.00
d. Detroit (2)	3.00	4.50
4. *Hotels*		
a. Manger, Cleveland	3.25	6.00
b. Secor, Toledo	3.00	5.00
c. Bancroft, Saginaw	3.50	5.50
d. Sheraton-Cadillac, Detroit	3.50	7.00
Total indicated minimum	50.75	
Possible extras as indicated in Column II		16.25
Total indicated maximum		67.00

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* The $30.00 deposit will cover the cost of transportation *only*. Meals and hotel bills will be paid by you in *cash* during the trip.

7

The
OHIO STATE UNIVERSITY

DEPARTMENT OF
CHEMICAL ENGINEERING

FIFTY-FOURTH ANNUAL

CHEMICAL ENGINEERING INSPECTION TRIP

CHEMICAL ENGINEERING 704
SOUTHERN INSPECTION TRIP

MARCH 22-MARCH 27, 1965

PUBLISHED BY THE UNIVERSITY AT COLUMBUS

THE OHIO STATE UNIVERSITY

The Ohio State University, located in Columbus, is a part of the public educational facilities maintained by the State. It comprises ten colleges and a graduate school:

The College of Agriculture and Home Economics
The College of Arts and Sciences
The College of Commerce and Administration
The College of Dentistry
The College of Education
The College of Engineering
The College of Law
The College of Medicine
The College of Pharmacy
The College of Veterinary Medicine
The Graduate School

This bulletin is devoted exclusively to the itinerary of the Southern Inspection Trip for Chemical Engineering students, required of all fourth year students in the Chemical Engineering curriculum, being Chemical Engineering Course No. 704.

OBJECT. These trips are intended to give to the chemical engineering student some practical knowledge of the magnitude of modern Chemical engineering industrial operations from a selected variety of examples, and to give a practical opportunity for acquaintance with the different branches of the profession of chemical engineering in proper perspective, and to furnish training in observation, report writing, and discussion. They are strictly educational and are required for graduation in Chemical Engineering.

The detailed instructions herein are vital to acquirement of the maximum educational opportunities of the trips, though these details are incidental or merely the usual common sense required by experience in organized effort. On this trip remember at all times you represent the Department of Chemical Engineering, The Ohio State University.

SOUTHERN INSPECTION TRIP
MARCH 22-27, 1965

IN ALL MATTERS OF DOUBT IN REGARD TO ITINERARY, CONSULT DIRECTOR IN CHARGE.

This bulletin gives in detail the advice, instructions, itinerary, etc., of the Fifty-fourth Annual Inspection Trip of Chemical Engineering students conducted by the Department of Chemical Engineering of The Ohio State University.

GENERAL INSTRUCTIONS. Due to the strenuous nature of the schedule, each man should conserve his strength as much as possible and get plenty of **rest and sleep each night.** This is **not a pleasure trip,** but a serious effort to obtain information **at** first hand, of the technical applications of chemistry and engineering in chemical manufacturing enterprises.

Travel light, with small suitcase, because of tedious carry at different points. Include a light- or medium-weight overcoat because of weather variability in lake cities. Wear well-fitting, **previously worn shoes** which you have found are easy on your feet under walking conditions. **Open mesh, porous, high heeled, crepe soled, rubber soled, and heel and toe plate shoes are not allowed in most chemical plants. Do not come on trip with new shoes.** Start the trip in **prime physical condition.**

Safety **goggles and safety-hard hats** will be furnished each member of the party. **Wear** them in every plant.

Wear your official inspection badge in plants and when boarding busses.

Promptness in all appointments is absolutely essential because the companies have been notified that visits will be made at certain specified times. Members not staying at the hotels must **notify the assistant trip director, and the proper squad captain** not later than the previous day of the point at which they will join the party so that an unnecessary search will not be made for them. They must adjust their schedules so as to be on hand at the appointed stations or plants exactly on time. If you should be either early or late, **stay out of the plant** so as not to annoy its officers.

Hotel Bills. Each man must pay his own hotel bill **before** checking out. He is responsible for his own **luggage.** Accidental omission of paying for hotel and meals looks bad for the University and hurts its good name. **Report payment of hotel bill to your squad captain before party's departure from hotel.** The squad captain will report to the financial assistant.

Attendance. A roll of attendance will be kept for each item of the itinerary. No one is excused from any portion of trip or from a conference unless previous arrangement **in writing** has been made.

Plant Inspection. On arrival at each plant, squads will form **IMMEDIATELY and these divisions must be strictly maintained throughout the round of the plant.** DO NOT STRAGGLE BEHIND: it causes annoyance of the guides and other employees. Ask all the questions you desire. Notes should be taken, whenever possible, and when not forbidden by desire of the company. Such a desire, if made known, must be respected. Notes are to be written up more fully in the evenings. **PHOTOGRAPHS MUST NOT BE TAKEN AT ANY PLANT.** Under no consideration may **cameras** be **taken into plants. Leave all cameras in busses at your own risk.** *Leave matches and lighters in busses. Smoking on plant premises is prohibited.*

Walk on the left side of plant roads, facing traffic unless sidewalks are provided or unless specifically directed otherwise.

Keep out of the way of workmen. Do not obstruct operations. **Please do not question the operators.** Annoyance of girl employees will not be tolerated; influence on succeeding trips would be serious. Gentlemanly conduct is always necessary. Skylarking is dangerous to individuals and is always annoying to plant officers; it is forbidden at all times. Souvenir collecting is forbidden.

If party arrives at plant ahead of time, or there is delay in time of plant inspection, members of party should form in squads for group conference.

INFRACTIONS OF THESE INSTRUCTIONS WILL RESULT IN DISMISSAL FROM THE TRIP.

Plant Departure. To avoid the missing of connections and delay and annoyance to our hosts at the next plant, it is mandatory that the **schedule of departure from each plant be maintained.** One squad staying **overtime** may disturb the whole **day's program.**

TRANSPORTATION ASSISTANTS. The squad captains will be under the supervision of a group transportation assistant to whom his squad is assigned, and as hereinafter indicated. Each bus will also be under the supervision of a transportation assistant. The duties of these assistants shall be:

1. Report to the Assistant Director as to the status of occupants of his bus after each plant visit and at all transportation starts.
2. Line up his squads in proper sequence before each plant visit.
3. Report to Assistant Director concerning the status of his squads in the mornings. They will be responsible for their squads at all times.
4. Receive reports from checking assistants concerning articles forgotten by the members. Report losses to Assistant Director.

SQUAD CAPTAINS. Each squad will be in charge of a captain. Members designated by heavy type in squad assignments will serve as squad captains.

Squad captains will rotate from day to day. For example, the first member of a squad will be squad captain the first day, the second member the second day, etc.

If a particular squad captain cannot be available for duty on his day, he should make arrangements with another member of his squad and report this change to his transportation assistant.

The captain is responsible at all times for keeping his squad intact. Squad captains shall keep squads as near the directors and guides as possible, and prevent straggling by bringing up the rear of their squads. At plants where a number of guides are furnished, it will help the guides of the various parties, and it will therefore be the **duty of each squad captain** to see as his **party starts** that the guide **understands the time of terminating the visit** so that he may divide his time accordingly. The squad captain **shall also notify the guide five minutes before** the departure time that the time of departure has arrived.

Captains shall report to special transportation **assistant** in charge of his squad **immediately after each visit** and before the next move as to the status of his squad. They will assign to the members of their squads different parts of topics upon which they will report as the squad captain sees fit. Before leaving each city squad captains must report to the special transportation assistant in charge of his squad, the status of his squad as concerns payment of hotel bills, etc.

Each member of a squad is required to remain with his squad on all transportation moves, and other complicated movements of the party; each squad captain is charged with seeing that he has all members of his squad with him when the party makes a move.

While on the trip, in order to protect the party against late sleepers and failures of callers to call individuals, squad captains will report to their transportation assistant immediately on being called in the morning, and will require members of their squad to similarly report to them. The transportation assistants will report to the Assistant Director. The necessary information regarding room numbers will be obtained the evening before. **No squad captain shall go to breakfast until he knows that every member of his squad is awake.**

To avoid confusion and expedite securing of keys, members of party will line up in single file, at key clerk's desk, by squads and in numerical order. The Assistant Director will obtain and distribute keys. For those doubling up in hotel rooms, roommate with lowest number will obtain key, while others will drop out of line. See mimeographed sheets for details.

REPORTS. Written reports on standard 8½- by 11-inch note paper with covers are required. Reports must be brief, and be specified additions to your general knowledge, and quantitative where possible. They will be submitted in dittoed form so that each member of the party will have a copy.

Final reports shall be submitted by squads, and not by individuals. Each plant shall be a complete report covering the points of view given below. The squad captain of the day will assign each member of his squad his particular specific assignment. There will be an examination, as indicated later in this bulletin, on all plants visited. Squads will be expected to have conferences among themselves to discuss in detail each plant visited and all the points of view. Each member of the squad is expected to avail himself of every opportunity of acquiring first hand information of all points of view. The squads will submit a final report containing a report on each plant in the standard report cover. The squad captain of the day will be responsible for the final compilation of the plants visited that day. He will make assignments to members of his squad. He will also submit a report grading each member of the squad. See mimeographed sheet for details.

Points of View for Organization of Plant Reports

I. *Market Demand and Economics: Finished Products.* Specifications; Output, Uses of products produced. Suggestions of other uses of these products.

II. *Chemistry or Process:* Simplified Reactions; Quantities involved; Data; Flow sheet. Suggestions of uses and possible markets of by-products.

III. *Chemical Engineering Operations:* Operating data; Performance; Material and power consumption; Flow sheet; Principle and operation. Suggestions of other chemical engineering operations which might be used and reasons.

IV. *Instrumentation:* Types of instruments, as indicating, recording, and controlling; Reasons for selection; Principles and operations. Suggestions of additional or alternative instrumentation, giving reasons.

V. *Machines or Equipment:* Types in use; Name plate references; List of special machinery; Capacities and performance; Distinctive features of this plant. Suggestions with reasons of alternative equipment or machines to increase efficiency or production.

VI. *Units Operated:* Power per unit; Reason for subdivision into units; Capacities. Suggestions with reasons for changing the units operated or the process to bring about increased efficiency, increased production, or lowered cost.

VII. *Plant Control:* Points in the process where tests are made. Methods of testing and special laboratory testing devices; Checking operations. Suggestions with reasons for additional plant control.

VIII. *Organization Chart and Personnel:* Types; Supply; Turnover. Suggestions with reasons for any change.

IX. a. *Engineering materials of construction* utilized in the plant, with reasons for their use, and suggestions as to the advantageous use of other materials, such as Duriron, Rubber Lined Equipment, Alloys Plastics, and Pyrex, with reasons for your suggestions.

b. *Plant and laboratory equipment* which could be used or modified for use in the laboratories of Chemical Engineering at The Ohio State University, pointing out what will be illustrated or taught thereby or how useful as a basis of investigation.

X. a. *Property and Accident Hazards:* Existence of the Hazards in plant, and precautionary measures employed.

b. *Personnel—Welfare.* Recreation; Sanitation; First Aid; Employees' comfort such as Rest Rooms, Cafeterias, Drinking Fountains, etc.

c. *Suggestions* which should be incorported in the Chemical Engineering Laboratories of Ohio State University.

d. *Color codes* to designate equipment, pipe lines, safety devices, etc.

XI. *The name and plant title of your guide.*

The **final** grade in this course will be evaluated on the following basis:

1. Participation in the inspection trip......	25%
2. Group Report	25%
3. Personal Characteristics	10%
4. Squad Foreman's Report................	10%
5. Written Examination on the Trip........	30%
	100%

SPECIAL STAFF ASSISTANTS

Thomas Fitz, General Transportation Assistant. In charge of receiving all reports from Transportation Assistants, and in charge of all squads on all movements especially squad organization prior to visiting the plants. Messrs. **James Nye and William Deerhake** will work with **Thomas Fitz** as indicated below. It will be noted that there will only be one bus on all movements. He will also be the liaison man between the Director and the party.

James Nye, Transportation Assistant. In charge of squads I and II.

William Deerhake, Transportation Assistant. In charge of squads III and IV.

James Gosney and Carter Castilow, Financial Assistants. In charge of checking on the payment of hotel bills. Squad captains will report to **Carter Castilow.** They also check on the payment of gratuities for porters, waitresses, etc.; **James Gosney** will prepare financial report of gratuities.

James Arnold and Hugh Zeller, Checking Assistants. They will check the number of bags at the various transfer points on the trip, and especially in the cases where the baggage is handled by transfer companies. They will report to the Assistant Director concerning the status at the end of each transportation move.

Jerome Balkenhol, Jeffrey Haas, Ralph Jutte, Lawrence Mathew, John Mitchell and Donald Mozeleski, Log Assistants. Will submit a detailed log of entire inspection trip. They will also confer with trouble shooters and recommend changes in inspection trip bulletin material. The report of the cartographers will also be included in their report.

Michael Konicek, Stephen Marlow and Donald Whiteman, Photograph Record Assistants, will have charge of organizing and mounting photographs taken on the trip. They will also arrange for a group photograph. **Donald Whiteman** will have the responsibility of the final presentation of the photographs for framing and permanent display.

Frank Dobscha, Edward Jefferis, William Lowrie, Glenn McKee and Jerry Morton, Trouble Shooters, will submit a report concerning suggested changes which could be made in future trips in regard to arrangements, as transportation, details of plant visitation, and also anything from point of view of betterment of trip. These men will receive complaints, if any, as to service and otherwise. They will also appreciate memoranda suggestions for betterment. **Frank Dobscha** will submit the report.

Albert Shuki and Richard Furlow, Cartographers. A report will be submitted by this group indicating the **exact route** followed on this trip. They also will suggest better routes which should be followed on future trips. **Albert Shuki** will be in charge of the organization. This report will be included in the log assistants' report. They will receive suggestions from members of the party.

Gary Moye, Report Assistant, in charge of distribution of master ditto sheets. Each squad captain should make an appointment with **Gary Moye** to obtain instruction concerning operation of Ditto Machine.

SQUADS ASSIGNMENTS

Squad I	Squad II
1. Arnold, J. G.	2. Balkenhol, J. E.
5. Dobscha, F. J.	6. Fitz, T.
9. Haas, J. E.	10. Jefferis, E. F.
13. Lowrie, W. G.	14. Marlow, S. W.
17. Mitchell, J. W.	18. Morton, J. R.
21. Nye, J. O.	22. Shuki, A. R.

Squad III	Squad IV
3. Castilow, C.	4. Deerhake, W.
7. Furlow, R.	8. Gosney, J.
11. Jutte, R.	12. Konicek, M. G.
15. Mathew, L. D.	16. McKee, G. L.
19. Moye, G.	20. Mozeleski, D. J.
23. Whiteman, D. P.	24. Zeller, H. J.

FIFTY-FOURTH ANNUAL
INSPECTION TRIP FOR CHEMICAL ENGINEERS

SOUTHERN TRIP

The Ohio State University, 1965

MONDAY, MARCH 22

6:15 a.m. (E.T.)—Assemble at entrance of Chemical Engineering Building, by squads. Squad captains report to transportation assistants who will report to Assistant Director.

6:30 a.m.—Board special bus of Lake Shore Lines. There will be one bus.

6:40 a.m. (E.T.)—Leave University grounds. To Interstate-71 via Olentangy River Road. Follow I-71 to I-275 in Cincinnati; right on I-275, left on I-75 to Mitchell Avenue Interchange in Cincinnati. Right on Mitchell Avenue to Spring Grove Avenue. Right on Spring Grove Avenue to Vine Street. Right on Vine Street.

9:00 a.m. (E.T.)—Arrive at and visit

(I) THE PROCTER & GAMBLE COMPANY

Cincinnati Toilet Goods Plant

This is one of two plants making toilet goods, such as shampoos, waving lotions, toothpastes, and deodorants. Because of the value of these products, the processes are on a relatively small scale. This, coupled with the built-in flexibility of operations, is reminiscent of pilot plants.

St. Bernard Plant

The principle features of this plant are the two "Standard Tower Units" manufacturing synthetic detergents. Alkylate is sulfonated and fatty alcohol sulfated in a continuous process to make the detergent paste which is mixed with other ingredients and spray dried. Air conveying cools and classifies the product.

11:15 a.m. (E.T.)—Board special bus for transfer. Turn right on Railroad Avenue, right on Beech Street, left on Spring Grove Avenue, right on Este Avenue, left on Center Hill Road.

11:30 a.m. (E.T.)—Arrive at the

Winton Hill Technical Center

This campus-like group of buildings houses the technical headquarters of the International, Foods, Toilet Goods, and Paper divisions.

11:45 a.m. (E.T.)—*Lunch, guests of the Procter & Gamble Company.*

12:30 p.m. (E.T.)—Tour: Foods Products Process Development laboratories and pilot plants.

1:15 p.m. (E.T.)—Board special bus for transfer. Left on Center Hill Road, right on Vine Street, straight on Spring Grove Avenue at fork, right on June Street, right into plant.

1:30 p.m. (E.T.)—Arrive at and visit

Ivorydale Fatty Alcohol Plant

In this plant tallow is first refined by caustic treatment, centrifuging, and washing. The refined tallow is reacted with methanol in the presence of sodium methylate catalyst to make methyl esters and glycerine. The methyl esters are then hydrogenated in a high-pressure, high-temperature, catalytic reaction to produce fatty alcohols. Catalyst is centrifuged out and recycled and the fatty alcohol is purified by distillation for use in detergents.

2:30 p.m. (E.T.)—Arrive at and visit

Experimental Synthesis Plant

The Experimental Synthesis Plant is flexible in use and varied in process equipment and design; its multifunctional purposes include process demonstration, experimentation, and semi-works production of surfactants for consumer product formulas and of industrial chemicals for test sales.

3:00 p.m. (E.T.)—Board special bus for trip to Charleston, West Virginia. Left on Este Avenue to Spring Grove Avenue. Right on Spring Grove Avenue to Mitchell Avenue. Left on Mitchell Avenue to interchange with Interstate 75. Right on Interstate 75 to Fort Washington Way. Left on Fort Washington Way onto Columbia Parkway. Right on Delta Avenue to Kellogg Avenue., left on Kellogg Avenue which is U.S. 52. Travel Route 52 to Huntington, West Virginia. In Huntington, left on 5th Avenue, right on 29th Street (U.S. 60). Outside Huntington bear left onto I-64, follow I-64 to Rt. 17, turn right on Rt. 17, left on U.S. 60 to Charleston, West Virginia. In Charleston right on Kanawha Blvd., left on Capitol to Washington.

9:00 p.m. (E.T.)—Arrive at

THE DANIEL BOONE HOTEL

Capitol and Washington Streets. Obtain room assigned and keys. Read mimeographed instructions concerning obtaining keys.

Evening open, but note first, the time of rising call. There are a number of good restaurants in the neighborhood, such as Hotel Coffee Shop, Quarrier's Diner (Quarrier and Dunbar Sts.).

TUESDAY, MARCH 23

6:00 a.m. (E.T.)—Rising call. Squad captains report to General Transportation Assistant by telephone. Breakfast out or in Hotel breakfast room.

7:45 a.m. (E.T.)—Assemble in Hotel Lobby by squads. Squad captains report to Transportation Assistants.

8:00 a.m. (E.T.)—Take Special O.S.U. Bus of Lake Shore Lines, left on Lee, right on Broad, left on Kanawha River Rd. Travel U.S. 60 to Belle, West Virginia.

8:30 a.m. (E.T.)—Arrive at and visit plant of

(II) E. I. DU PONT DE NEMOURS AND COMPANY

Industrial and Biochemicals Department
Belle Works

Construction of the plant was started in 1925 for the primary purpose of the high pressure synthesis of anhydrous ammonia. The Belle Plant, therefore, represents the Company's first commercialization of high pressure synthesis. It has pioneered the development of many new products through the use of a number of novel chemicals reactions and unique processing conditions. Including in this wide range of operating conditions are process pressures ranging from a few millimeters of Hg absolute to about 800 atmospheres, temperatures from a low of —200°C to a high of 1,500°C, and flows from a few cc's per minute to 60,000 cfm. Reactions involving gases, liquids, gas-liquid solids are all employed at Belle. Essentially, all types of catalytic processes are also used. Belle produces about fifty products. The following are representative: ammonia, "Zerone"[R], "Zerex"[R], and Telar[R] antifreezes, urea, intermediates for nylon yarn and molding powder, Methyl Methacrylate monomer for "Lucite"[R] acrylic molding powder, Hydroxyacetic Acid, Methylamines, Methyl Formate, Formamide, and "Uramite"[R] fertilizer compound.

8:40 a.m. (E.T.)—Briefing Period of the various plant operations and their interrelationships.

12:45 p.m. (E.T.)—*Lunch, guests of the E. I. Du Pont de Nemours and Company.*

1:25 p.m. (E.T.)—Resume plant inspection.

3:30 p.m.—Leave plant and board bus. Retrace route of morning to Capitol and Washington Streets.

4:00 p.m. (E.T.)—Arrive at

THE DANIEL BOONE HOTEL

Evening open. A list of restaurants in Charleston are given on page 13.

It is suggested that you pay your hotel for the two days the evening of March 23.

WEDNESDAY, MARCH 24

6:15 a.m. (E.T.)—Rising call.

6:20 a.m. (E.T.)—Squad captains assure themselves members of their squads are well on their way, and report to their Transportation Assistants, who will report to the Assistant Director. **If you have not already paid your hotel bill, do so at once.**

7:15 a.m. (E.T.)—Assemble in hotel lobby by squads. Squad captains report to Financial Assistants concerning status of payment of hotel bills of his squad.

7:30 a.m. (E.T.)—Board bus at Washington Street entrance. Follow Washington St. to Patrick St., turn left and cross Patrick St. bridge to U.S. 60. Follow west to "A" Street stop light, turn left to Kanawha Turnpike and turn right at stoplight. Follow to Technical Center.

8:00 a.m. (E.T.)—Arrive at *Union Carbide Technical Center Cafeteria for breakfast—guests of Union Carbide.*

8:45 a.m. (E.T.)—Leave for South Charleston plant and assemble in Room 104—main office building on U.S. 60.

(III) UNION CARBIDE CORPORATION
CHEMICALS DIVISION—OLEFINS DIVISION

South Charleston Plant

Union Carbide Corporation was founded in 1917 from five companies that were producing widely different products, but were closely related in their business and research activities.

Each company was a pioneer in its own field. During subsequent years, many new companies were added to the Union Carbide family. Today, the Corporation is one of the most diversified manufacturing companies in the world.

The Corporation has a vast network of over 500 plants, mines, mills, laboratories and sales offices, located in nearly every part of the globe, employing about 70,000 people.

The Corporation's key fields of activity are chemicals, plastics, alloys and metals, industrial gases, welding and cutting equipment, carbon and graphite products, nuclear energy, and fibers and fabrics.

The Chemicals Division was created in 1920, when a small gasoline plant was purchased and transformed into the first petrochemical plant. This plant was moved to South Charleston in 1925, where today can be seen one of the world's larger chemical installations.

Other Carbide operations in the Charleston area included a second chemical plant at Institute and the Technical Center, also located in South Charleston, where the Research, Development, Engineering, Design and Construction Departments provide their respective services for the nine plants of the Chemicals and Olefins Divisions of the Corporation.

Over 400 basic organic chemicals, resins and fibers are produced in these two plants; however, additional quantities of large-volume chemicals are also made in other plants in New York, Indiana, Texas and California. A new chemical plant is currently under construction at Taft, Louisiana.

Representative of products made in the Charleston area are: ethylene oxide, styrene, acrylonitrile, peracetic acid, alcohols, glycols, cellosolve, "Prestone" anti-freeze, methanol, ethylene and propylene derivatives, vinyl resins, polyethylene, amines, "Sevin" insecticide, glyoxal, vinyl acetate, acrylates, polyols for urethane foams, food chemicals—including sorbic acid and potassium sorbate, and many others.

The South Charleston plant has pioneered the development of many new chemicals in the Pilot Products and Fine Chemicals Departments.

The Olefins Division was formed in 1957 by separating from the Chemicals Division all groups working on the procurement of raw materials and their conversion to olefins.

9:00 a.m. (E.T.)—Briefing period of various plant operations and assignment of hosts to squads for plant tour.

9:30 a.m. (E.T.)—Start plant tour.

12:30 p.m. (E.T.)—*Lunch, guests of Union Carbide, plant cafeteria.*

1:15 p.m. (E.T.)—Resume plant tour.

2:30 p.m. (E.T.)—End plant tour and reassembly in Room 104 for final briefing.

3:30 p.m. (E.T.)—Leave plant and board bus for Parkersburg, W. Va. Travel on U.S. 60 to Patrick St. bridge, cross bridge and take U.S. 21 and I-77 to Parkersburg, W. Va. In Parkersburg, continue on U.S. 21 to Market St., turn right on Market to 6th St.

5:30 p.m. (E.T)—Arrive at

CHANCELLOR HOTEL

Sixth and Market. Obtain room assigned and keys. Read mimeographed instructions concerning keys. *It is suggested that you pay your hotel bill Wednesday Evening.*

THURSDAY, MARCH 25

6:00 a.m. (E.T.)—Rising call. Squad Captains report to Transportation Assistants by telephone. Breakfast out or in Hotel breakfast room.

7:15 a.m.—Assemble in Hotel Lobby by Squads.

7:30 a.m.—Board special bus. Take Route 2 out of Parkersburg. Four miles out of Parkersburg, turn right on Washington cutoff for about 3 miles and—

8:00 a.m. (E.T.)—Arrive at the plant of

(IV) E. I. DU PONT DE NEMOURS & COMPANY

Plastics Department
Washington Works

Washington Works is located about 8 miles west of Parkersburg, on a 600-acre plot of ground adjoining the Ohio River. Started up in 1948, it has experienced almost continuous growth and today, it is the second largest plant in the Plastics Department. Its products include:

"Butacite"[R] polyvinyl butryal resin sheeting. This material is used as safety glass inner layer because it holds shattered pieces of glass together under impact.

"Zytel"[R] nylon resin is a polymer exhibiting extreme toughness and strength. Its abrasion resistance, great impact strength, resilience and bearing characteristics make it suitable for use in machine parts and other applications.

"Tynex"[R] nylon filaments are employed for brush bristles, fishing lines, leaders and surgical sutures.

"Stren"[R] spinning line is a spin fishing line which is 20% stronger and has one-third less stretch than standard monofilament lines.

"Delrin"[R] acetal resin is a tough, rigid thermoplastic which is easily fabricated and is resistant to variations in temperature and moisture. Some of its uses are for automobile parts, industrial machinery, packaging, electrical equipment and appliances, pipe and plumbing fixtures.

"Lucite"[R] acrylic resin is noted for its excellent optical properties and resistance to weathering, making it suitable for use in illumination fixtures, medical and hospital devices, and in the household, automotive and appliance fields.

"Teflon"[R] fluorocarbon resin is a polymer offering a unique combination of electrical, chemical and thermal characteristics. It is inert to practically every commercially employed chemical and solvent.

"Dymetrol"[R] nylon strapping has outstanding characteristics which include excellent tensile strength, and good resiliency. It is inert to most chemicals, and will not soil or rust.

There are a wide variety of chemical processes used in the manufacture of these products. Most of the chemical reactions take place in fully automatic batch and continuous equipment. Extruders, dryers, distillation columns, blenders and complex materials-handling systems are common to most of the products.

A technical force of 150 engineers and chemists are employed in research, process engineering, project engineering, analytical development, and maintenance, instrument, and electrical engineering functions. An additional 90 engineers are employed in various supervisory and management positions.

Equipment available to assist the engineers include x-ray and mass spectrometers, gas chromatographs, infrared and ultraviolet spectrophotometers, physical testing equipment, injection molding machines, laboratory-scale extruders, and an IBM 1620 computer with accessories.

8:00 a.m. (E.T.)—Briefing period.

9:00 a.m. (E.T.)—Begin plant visit.

11:30 a.m. (E.T.)—*Lunch, guests of the E. I. Du Pont de Nemours and Company.*

12:30 p.m. (E.T.)—Leave plant, board bus for Willow Island. Retrace route back to Route 2, follow Route 2 through Parkersburg to Willow Island.

1:15 p.m. (E.T.)—Arrive at the plant of

(V) AMERICAN CYANAMID COMPANY

Organic Chemical Division
Willow Island Plant

The Willow Island Plant of American Cyanamid Company is located on a 1150 acre tract in Pleasants County, W. Va. bordering the Ohio River and approximately 15 miles north of Parkersburg. The plant employs approximately 575 people and manufacturers over 40 products which can be broadly classified as Pharmaceuticals, Pigments, Process Chemicals, and speciality products. There are six manufacturing departments, namely, Pharmaceutical, Pigment, Plastics, Aureomycin, Catalyst, and Aniline.

4:15 p.m. (E.T.)—Leave plant. Take Route 2 from Willow Island to Wheeling. In Wheeling, turn right onto 29th St., left on Rt. 91. Right onto U.S. 40 (I-70) to Washington, Pennsylvania. U.S. 19 from Washington to Pittsburgh, Pennsylvania. Cross Monongahela River at the Fort Pitt Bridge, follow Liberty Av. to 6th Street. Turn right on 6th, follow 6th to Grant.

8:00 p.m. (E.T.)—Arrive at the

PENN-SHERATON HOTEL

Obtain room assigned and keys. Read mimeographed instructions concerning keys.

FRIDAY, MARCH 26

6:15 a.m.—Rising call. Squad Captains report to Transportation Assistants. Breakfast out or in Hotel breakfast room.

7:45 a.m.—Assembly in lobby.

8:00 a.m.—Board bus for Monroeville, Pa. Down Grant Street to Penn Lincoln Parkway (U.S. 22 and 30). At Ardmore Blvd.

interchange continue to follow old U.S. 22. Turn right onto Monroeville-Pitcairn Road, turn right by old stone church, turn left at first traffic light on to Jamison Lane.

9:00 a.m. (E.T.)—Arrive at and visit the Research Center of the

(VI) UNITED STATES STEEL CORPORATION

1. *Research Center, Monroeville, Pennsylvania*

Applied Research Center conducts research on a vast scale, ranging from the beneficiation of raw materials and the improvement of smelting and steelmaking practices to the development of new alloys, the recovery and purification of coal chemicals, and the design of electronic control equipment.

11:45 a.m.—Leave Research Center. Board bus for Clairton, Pa., follow Penn. State Route 48 to Buena Vista, then right on Lovedale Rd., to West Elizabeth, right onto Penn. Route 837.

12:45 p.m. (E.T.)—Arrive at Clairton Works via Benzol Gate and proceed to Coke and Coal Chemical Office Building.

1:00 p.m.—*Luncheon, Coke Works Dining Room. Guests of United States Steel Corporation.*

2. *Clairton Coke and Coal Chemical Works*

2:00 p.m.—Start tour of world's largest Coke and Coal Chemical Works comprising 1375 ovens for carbonizing 34,000 tons of coal daily.

Coal carbonization for the production of metallurgical coke and the primary coal chemicals such as gas, tar, ammonium sulphate, pyridine bases and light oil.

Coal and coke handling and storage. Refining of pyridine bases, tar and light oil.

3. *Clairton Steel Works*

4:00 p.m. (E.T.)—Start tour of Clairton Steel Works.

Rolling Mills: Finish-mills producing structural beams, channels, bars and plates, etc.

4:30 p.m. (E.T.)—Board special bus for Pittsburgh, Pa. via Rt. 51, turn right on U.S. 22. Cross Ft. Pitt bridge, turn right on 6th.

5:30 p.m. (E.T.)—Arrive at

PENN-SHERTON HOTEL

William Penn Place, between Sixth Ave. and Oliver

SATURDAY, MARCH 27

6:15 a.m. (E.T.)—Call for rising. Squad captains assure themselves that members of their squads are well on their way, and report to their Transportation Assistant, who will report to Assistant Director. Breakfast Hotel Coffee Shop or restaurant in neighborhood. **Be sure to pay your hotel bill.**

7:45 a.m. (E.T.)—Assemble in lobby. Squad captains report. **Those who plan to return to Columbus, other than by bus, carry baggage with you.**

8:00 a.m. (E.T.)—Board special bus of Lake Shore Lines for Kobuta, Pa. Proceed out 6th Avenue, left on Liberty Avenue across Fort Pitt Bridge, continue on the Penn-Lincoln Parkway (U. S. 22) which becomes the Airport Parkway (Rt. 60) past Airport, turn right at first street past Airport to Pa. 51, bear left on Pa. 51 to junction with Pa. 18, turn left on Pa. 18 to Kobuta, Pennsylvania.

9:00 a.m. (E.T.)—Arrive at and visit plant of

Leave all lighters and matches in bus.

(VII) SINCLAIR-KOPPERS COMPANY

Kobuta Plant, Monaca, Pa.

The Kobuta Plant, which borders on the Ohio River 30 miles west of Pittsburgh, Pa., began production of styrene and butadiene (from alcohol) for the nation's synthetic rubber program in 1943.

The plant has been expanded utilizing the styrene monomer as a base to produce Dylene[R] polystyrene resins, Dylite[R] expandable polystyrene beads, and Dylex[R] styrene latices.

The butadiene facilities were last in operation during the Korean War and are maintained in standby condition for quick start up in the event of a national emergency.

The Product Development Laboratories of the Sinclair-Koppers Co. are located on the Kobuta Plant site. This laboratory conducts the various studies required for product improvement and for modifications to meet customer requirements.

11:00 a.m. (E.T.)—Leave plant, board bus for restaurant, vicinity of Florence, Pa., via Rt. 18. The Farm Restaurant is located on U.S. 22.

12:00 p.m. (E.T.)—Luncheon. The Farm Restaurant. Menu according to reservations made in advance. Do not make last minute changes.

1:00 p.m. (E.T.)—Leave dining room.

Those returning to Columbus will board bus which will follow U.S. 22 which will pass through Steubenville, Cadiz, Cambridge, and Zanesville. U.S. 40 will be followed into Columbus from Zanesville. (There will be a 20 minute stop in Cambridge.)

5:30 p.m. (E.T.)—Arrive Chemical Engineering Building, The Ohio State University Campus.

Return safety goggles and hard hats to Mr. Mike Kukla on Monday, March 29.

Squad Captains will obtain "Ditto" master copies for their report from Report Assistant.

WRITTEN REPORTS DUE THURSDAY, APRIL 22, 1965.

EXAMINATION ON THIS TRIP THURSDAY, APRIL 22, 1965. ROOM 207 CHEMICAL ENGINEERING BUILDING, at 5:00 p.m.

SUGGESTIONS FROM ANY POINT OF VIEW FOR THE BETTERMENT OF ANY FEATURE OF THE TRIP ARE REQUESTED.

TRIP IN CHARGE OF

JOSEPH H. KOFFOLT,
Chairman, Chemical Engineering Department

Assisted by:

EDWIN R. HAERING
Instructor in Chemical Engineering

RONALD KOVACH
Instructor in Chemical Engineering

FOR HOTEL ARRANGEMENTS SEE MIMEOGRAPH SHEET.

EXPENSE ACCOUNT ESTIMATE*

	I	II
1. *Incidental*		
Fund (for baggage transfer, tips, etc.) in Director's care	$ 2.00	
2. *Bus Fare*		
Six day charter bus for entire trip	30.00	
3. *Meals*		
a. Charleston (3)	5.00	10.00
b. Parkersburg (2)	3.00	6.00
c. Pittsburgh (4)	7.00	12.00
d. Farm Restaurant (1)	1.00	2.00
4. *Hotels*		
a. Daniel Boone, Charleston (2 nights)	9.67	16.00
b. Chancellor, Parkersburg	5.50	7.00
c. Penn-Sherton, Pittsburgh (2 nights)	8.00	16.00
Total indicated maximum	71.17	
Possible extras as indicated in Column II		29.83
Total indicated maximum		101.00

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* The $30.00 deposit will cover the cost of transportation *only*. Meals and hotel bills will be paid by you in *cash* during the trip.

FELLOWSHIPS, SCHOLARSHIPS, GRANTS-IN-AID AND OTHER CONTRIBUTIONS TO THE CHEMICAL ENGINEERING DEPARTMENT

Industry and the alumni have been very generous in their contributions to Both undergraduate and graduate work in Chemical Engineering. Listed below are the companies which have contributed fellowships, scholarships, and grants-in-aid. These contributions amount to over $80,000 a year and do not include contributions by the alumni. These contributions contribute materially to the undergraduate and graduate programs of the Department.

FELLOWSHIPS

1. American Oil Foundation
2. Dow Chemical Company
3. Diamond Shamrock Company
4. Koppers Company Teaching Fellowship
5. Shell Companies Foundation
6. Union Carbide Corporation
7. Lubrizol Corporation
8. Procter and Gamble Company
9. Ohio State University
10. National Science Foundation
11. Louis A. and Lucille Roberts Memorial Fellowship Fund
12. Arno C. Fieldner Research Fellowship in Chemical Engineering
13. NASA
14. University Dissertation Fellow

SCHOLARSHIPS

1. Dow Chemical Company
2. Goodyear Foundation
3. Koppers Company, Inc.
4. Monsanto Company
5. Pittsburgh Plate Glass Foundation
6. Rohm and Haas Company
7. Standard Oil of California
8. Union Camp Corporation
9. Universal Oil Products Company
10. Dr. James R. Withrow Memorial Scholarship Fund
11. Owens-Corning
12. Pan-American Pet. Corp.
13. Union Oil Company
14. Joseph H. Koffolt Scholarship Fund

GRANTS-IN-AID AND OTHER CONTRIBUTIONS

1. American Cyanamid Company
2. Diamond Shamrock Company
3. Camille and Henry Dreyfus Foundation, Inc.
4. Dow Chemical Company*
5. Dow Corning Corporation
6. E. I. du Pont de Nemours and Co. Inc.*
7. Esso Education Foundation*
8. B. F. Goodrich Chemical Company
9. Harshaw Chemical Company, Division Kewanee Oil Company
10. Hercules Company*
11. Pittsburgh Plate Glass Foundation
12. Mead Corporation
13. Monsanto Company
14. Union Carbide Corporation*
15. Universal Oil Products Company**
16. Mobil Foundation Incorporated
17. Celanese Corporation Fund for Chemical Engineering*

* May also be used for a Fellowship
** Universal Oil Products Company has established three scholarships in Chemical Engineering and in addition to this a grant of aid of $500.

THE ALCOA PROFESSORSHIP IN CHEMICAL ENGINEERING

In March 1967 the Aluminum Company of America (ALCO) made a contribution of $60,000 for an Alcoa Professorship in Chemical Engineering. This amount covered a three year period. A program was set up in Polymer Engineering emphasizing the engineering rather than the pure science. Dr. Emerson Lynn was appointed to this Professorship. He came to us from B. F. Goodrich Chemical Company.

THE OHIO STATE UNIVERSITY
DEPARTMENT OF CHEMICAL ENGINEERING

M.SC. GRADUATE COURSE PROGRAM - CHEMICAL ENGINEERING

The Graduate Program for the M.Sc. degree is not a fixed curriculum. As will be noted, there is flexibility in the course work for the department. All programs must be approved by the student's graduate adviser and the departmental Graduate Committee.

The total minimum requirements for the M.Sc. degree are 45 hours. However, students working towards a M.Sc. degree on the combined B.Ch.E.-M.Sc. degree, the requirements are 50 hours.

REQUIRED GRADUATE WORK IN THE DEPARTMENT

1. The courses listed below are required of all students on the combined program. These courses may be waived for others who already have the B.Ch.E. degree or equivalent with the approval of the student's adviser and the instructor in charge of the course. These courses are waived only if it is determined that the student has had their equivalent in the B.Ch.E. program or in industry.

   a) Ch.E. 861 - Advanced Chemical Engineering Processes (3)
   b) Ch.E. 862 - Advanced Chemical Engineering Process Development (5)
   c) Ch.E. 830 - Advanced Chemical Engineering Operations Laboratory (4).........0-12

2. The following courses are required:

   a) Ch.E. 808 - Advanced Chemical Engineering Thermodynamics (3)
   b) Ch.E. 812 - Advanced Chemical Engineering Kinetics (3)
   c) Ch.E. 815.01 - Advanced Chemical Engineering Mass Transfer (3)
   d) Ch.E. 815.05 - Advanced Chemical Engineering Heat Transfer (3)
   e) Ch.E. 815.08 - Advanced Momentum (3)
   f) Ch.E. 881 - Chemical Engineering Seminar (2)................................17

3. Mathematics beyond Mathematics 512 - Advanced Engineering Mathematics........... 3
   Mathematics 412 will be accepted for students entering with B.Ch.E. degree or equivalent and who do not have the equivalent of Mathematics 412.

4. Chemical Engineering 999 - Chemical Engineering Research........................ 9
   A satisfactory thesis must be submitted. The total credit hours may exceed 9 hours, but these additional hours above the minimum requirement of 9 hours will not be counted in satisfying the total minimum hours.

5. Other Graduate Courses - A minimum of 9 hours must be taken from the list below. If the total minimum hours is less than 45, the extra courses must also be taken from the group below... 9+

   1. Graduate courses in Chemical, Nuclear, and Petroleum Engineering
   2. Graduate courses in Chemistry, Physics, Mathematics
   3. Graduate courses in the College of Engineering
   4. Graduate courses in Biological Sciences
   5. Graduate courses in other departments with approval of adviser

Total minimum hours 45

THE OHIO STATE UNIVERSITY

DEPARTMENT OF CHEMICAL ENGINEERING

Ph.D. PROGRAM IN CHEMICAL ENGINEERING

Graduate work in engineering should provide the student with opportunities for several scholarly achievements:

1. A broader background of basic science and engineering fundamentals.
2. An improved understanding and ability to use engineering fundamentals.
3. An intimate knowledge of a field of specialization.
4. A contribution to the knowledge of engineering.

In general, it appears that achievements (2) and (4) will be readily attained as a direct result of accomplishing achievements (1) and (3). In other words, broadening the base of engineering knowledge will indirectly improve the knowledge of other fundamentals and an intimate knowledge of a field of specialization may lead to technological contributions.

However, broadening the engineering knowledge, (1) and adding depth of a special field, (3) appear to be conflicting objectives. With intensive concentration in an area of specialization, it is difficult to cover much breadth in a reasonable time. Thus, some compromise must be made to provide a graduate program which is reasonable from the standpoint of student time. To acquire the greatest depth and the highest level of competency in all aspects of chemical engineering would require a good share of a lifetime - if this were at all possible. There is, however, a level of general competence that we should expect of all our graduate students in the basic and applied aspects of Chemical Engineering. It is the purpose of this paper to provide a guide as to the level and range this should be. It seemed most practical and expedient to define these objectives in terms of courses offered in our department.

I. GENERAL REQUIREMENTS

All candidates for the Ph.D. degree must have completed an M.Sc. degree. Each graduate student on the Ph.D. program will be give a two-quarter trial period after which the Graduate Faculty of the Department of Chemical Engineering will inform him of any shortcomings or deficiencies and advise him concerning his continuing toward the Ph.D. degree.

II. MINIMUM COURSE REQUIREMENTS

The minimum course requirements (beyond the Bachelor's degree) are classified into five areas:

1. Core Courses in Chemical Engineering

These courses include a cross section of fundamentals and application in the field of chemical engineering. They require as a general prerequisite a solid grounding in the material normally considered a part of an undergraduate curriculum in Chemical Engineering, including Chemistry. These courses, and the material considered as a prerequisite to them, constitute the area of knowledge covered on the general examination for candidacy for the Ph.D. degree. A student can be excused from any of these courses on the recommendation of his adviser and the approval of the instructor in charge of the course, who can determine if the student has an adequate background in the specific area to qualify him for taking the General Examination.

Ch.E. 815.01	Advanced mass transfer - I
Ch.E. 815.05	Advanced heat transfer - I
Ch.E. 815.08	Advanced momentum transfer - I
Ch.E. 808	Advanced chemical engineering thermodynamics
Ch.E. 812	Advanced chemical engineering kinetics
Ch.E. 830	Advanced chemical engineering operations
Ch.E. 861	Advanced chemical engineering processes
Ch.E. 862	Advanced chemical engineering process development
Ch.E. 881	Seminar (two required)

2. Mathematics

Nine credits of graduate level mathematics approved by the Chemical Engineering Graduate Committee.

3. Special Advanced Graduate Courses in Chemical Engineering

Courses in this area should be selected with the adviser's guidance and should be integrated into a program that will be of greatest value to the student.

Ch.E. 815.02	Advanced mass transfer - II
Ch.E. 815.03	Advanced binary and multicomponent distillation
Ch.E. 815.04	Extraction, azeotropic and extractive distillation
Ch.E. 815.06	Advanced heat transfer - II condensation, boiling, design applications
Ch.E. 815.07	Drying humidification and dehumidification
Ch.E. 815.09	Advanced momentum transfer - II
Ch.E. 815.10	Advanced momentum transfer - III Two-phase phenomena
Ch.E. 815.12	Advanced instrumentation and process control of chemical plants
Ch.E. 815.13	Design of experiments; data handling and analysis, quality control, linear programming
Ch.E. 815.14	Advanced process and plant design
Ch.E. 815.15	New or unusual chemical engineering operations such as adsorption, atmolysis, dialysis, ion exclusion, sublimation
Ch.E. 801	Advanced special problems (only where a special course is offered - not for minor research problems)
Ch.E. 809	Advanced chemical engineering thermodynamics
Ch.E. 813	Advanced chemical engineering kinetics
Ch.E. 825	Process modeling and simulation
Pet.E. 842	Petroleum production and oil field development and operational problems
Ch.E. 873	Advanced high polymer engineering

Graduate and advanced undergraduate courses in special areas:

Pet. E. 544	Well completion methods
Pet. E. 642	Reservoir engineering
Ch.E. 726	Chemical process dynamics and control -II
Ch.E. 770	Applied electrochemistry
Ch.E. 771	Air pollution
Ch.E. 773	Introduction to high polymer engineering
Ch.E. 775	Rheology of fluids
Ch.E. 776	Principles of Polymer conversion operations
Ch.E. 778	Nuclear chemical engineering
Ch.E. 779	Chemical engineering experimental design
Ch.E. 781	Chemical engineering optimization

Any other courses approved for graduate credit in Chemical Engineering

4. Minor Area

In general, the minor area is taken outside the Chemical Engineering Department. The only exceptions are Petroleum Engineering courses (P.E. 542, 543,743 and 641). The minimum requirement in the minor area is 15 credit hours.

Courses outside the department should be selected to develop a unified program related to the field of research or some field of special interest to the student; all 15 credit hours need not be in the same department. A few suggested areas are:

1. Physics
2. Chemistry
3. Mathematics
4. Nuclear Engineering
5. Other engineering fields
6. Mineralogy
7. Biological Sciences

5. Research

On the average, the credit hours for research (Ch.E. 999) will amount to at least 60-credit hours. It is recommended that each student select a research topic and begin research by the end of the first quarter of work in the Ph.D. program. A satisfactory dissertation as judged by the Reading Committee, under the Graduate School Rules, must be submitted as one of the requirements for the Ph.D. degree.

The Total Credit Hour Requirements

The minimum requirement for the Ph.D. degree is 135-credit hours (beyond the Bachelor's degree). The total academic course requirement (not including research or special project problems) is expected to be about 75-credit hours. A number of the above courses, or similar courses at other institutions, will have been taken for the Master's degree. Which of these courses will be accepted as meeting the minimum requirements for the Ph.D., will be decided by the adviser and the professor in charge of the course. The Chemical Engineering Graduate Committee, in cases where other courses or matters are involved, may be consulted for guidance and decision.

A summary of the minimum course requirement (beyond the Bachelor's degree) is as follows:

1.	Core Courses in Chemical Engineering	31 credit hours
2.	Mathematics	9 credit hours
3.	Special Courses in Chemical Engineering	20 credit hours
4.	Minor Area	15 credit hours
5.	Research	60 credit hours
	Total	135 credit hours

The above schedule shall serve as a measure for minimum requirements and is not meant to be rigid to the extent that the student's grade record shows credit for each of these courses. The student should have had the equivalent background corresponding to this level of proficiency in, and distribution of, subject areas; it is the duty of the student, with the help and approval of the adviser, to arrange a course schedule that meets these minimum requirements. Some of these requirements may be waived because of previous experience or related academic work in other departments or institutions. Appropriate course work for the Master's degree will be accepted allowing a maximum of 9-credit hours for research (Ch.E. 999).

III. LANGUAGE REQUIREMENT

Passing grade of C in eight (8) quarter credit hours of one (1) college-level foreign language or the equivalent thereof, determined by appropriate proficiency testing. Foreign students need only be proficient in English.

IV. EXAMINATION REQUIREMENTS

1. Ph.D. General Written Examination

When a student has met all of the above course and language requirements, he is eligible to take the Ph.D. General Written Examination in Chemical Engineering. This examination will be comprehensive and will examine the student's knowledge, understanding and ability to apply fundamental principles to the major field. The idealist would place very broad and undefined limits on this examination. In a practical sense, it is desirable to define at least a minimum standard as a guide. For this minimum standard, it is recommended that the student be responsible for a high level of performance, as judged by the staff, in the following:

a. Undergraduate courses in Physics, Chemistry, and all the Chemical Engineering courses.

b. Graduate area encompassed by courses under Item 1 - Core Courses in Chemical Engineering, except for Seminar.

The examination will consist of four (4) four-hour parts (M.,Tu., W.,Th.) taken during the mornings of the fifth or sixth week of the quarter. Candidates must declare their intention to take the examination to the Chairman of the Graduate Committee during the first week of the quarter in which the examination is to be taken.

Candidates are required to schedule the General Written Examination in the quarter immediately following the completion of course work or the language requirement. The candiate must have the approval of the Graduate Committee to delay the examination.

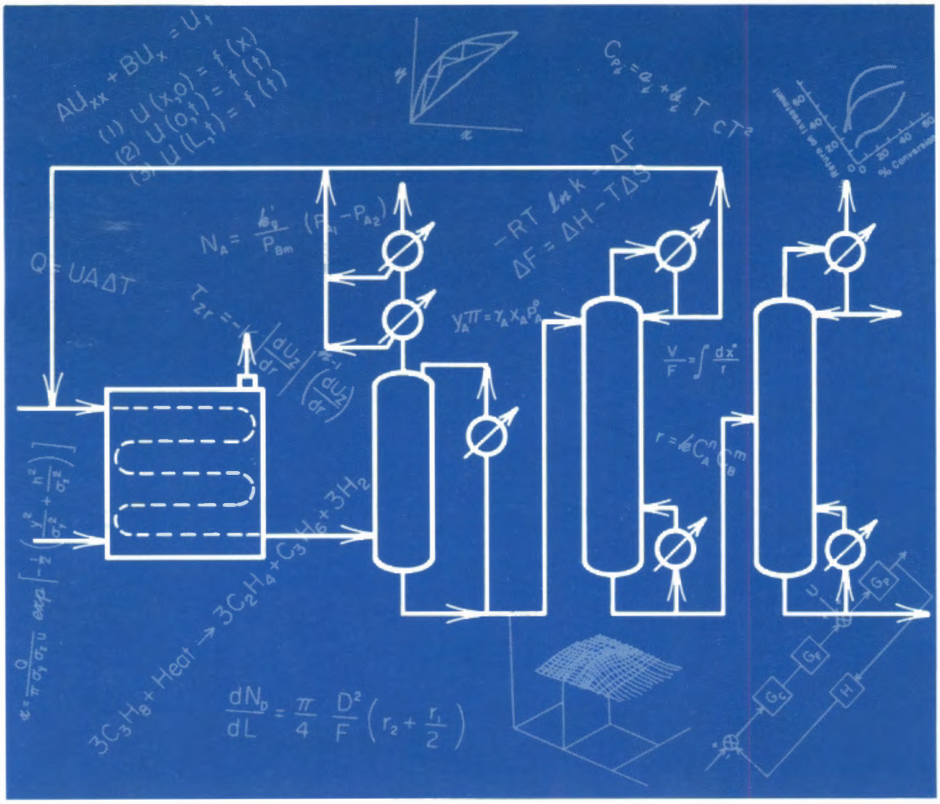
2. Ph.D. General Oral Examination

This examination will be conducted according to the rules of the Graduate School. The examination will be scheduled by the adviser during the same quarter of the satisfactory completion of the General Written Examination.

3. Ph.D. Final Examination

The main purpose of this examination is to present and to defend the work done on the dissertation. Graduate School regulations will be followed for the scheduling and the method of conducting this Final Examination.

Revised 2/3/69



GRADUATE STUDY

Chemical Engineering

OHIO STATE UNIVERSITY

Mass Transfer
Heat Transfer
Process Control
Reaction Kinetics
Momentum Transfer
Thermodynamics
Rheology
Air Pollution

Solid and Liquid Fuels
Polymer Engineering
Nuclear Engineering
Petroleum Reservoir Engineering
Chemical Engineering Operations
Optimization and Advanced Mathematical Methods
Process Dynamics and Simulation
Process Analysis and Design

This booklet was prepared by the Department of Chemical Engineering of Ohio State University to provide the information needed by a student who is about to make one of the most important decisions of his career—that of selecting a faculty under which to study for his advanced degrees.

The Department of Chemical Engineering at Ohio State, offering programs leading to the Masters of Science and Doctor of Philosophy degrees, is proud to introduce in this booklet its graduate faculty. The department is likewise proud to list the courses and laboratory facilities available to a graduate student.

A portion of the following pages is devoted to financial aid. Quoting, "Most students of chemical engineering receive financial aid in the form of assistantships, fellowships, or traineeships. The yearly stipend varies from $2300. to $4800." The availability of financial aid for graduate students of chemical engineering has never been so great; it is a credit to the graduate faculty introduced here that so great a financial aid program is available at Ohio State University.

As opportunities abound for the advanced-degree chemical engineer, so do outstanding programs and faculty await the student who elects graduate study at Ohio State University.

For further information regarding graduate study in chemical engineering at Ohio State University, write: Chairman, Department of Chemical Engineering, Ohio State University, 140 West 19th Avenue, Columbus, Ohio 43210. Or call: (614) 293-6896.

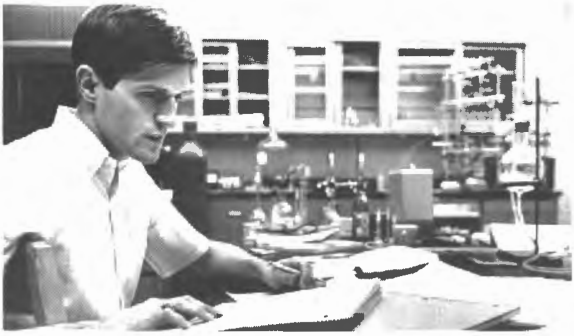
Aldrich Syverson
Department Chairman

THE GRADUATE program in Chemical Engineering has been offered at The Ohio State University for more than fifty years. During its history, more than 760 Master of Science degrees and 230 Doctor of Philosophy degrees have been granted. Graduates have assumed a wide range of responsibilities within this country as well as in many foreign countries. Many have achieved high positions in industry and education.

The chemical engineering faculty at Ohio State University includes fourteen full-time professors who have had academic and industrial experiences that span a broad spectrum of professional activities and interests. Research occupies an important role in graduate education and the close relationship between the teacher and the student, especially in research, is deemed one of the most valuable aspects of graduate work. The chemical engineering faculty directs considerable attention to this association which it considers to be one of the most effective methods to meet the aims and purposes of graduate education.

The requirements for both the Master's degree and the Doctor of Philosophy degree include a minimum core of basic chemical engineering courses followed by a program which permits concentration in an area of specialization arranged with the guidance of an adviser. Selection of a research topic and/or course option area can be made from a broad field since the faculty interests cover a wide cross section of chemical engineering theory and practice.

The research and teaching facilities for chemical engineering at The Ohio State University are among the finest available today. The Chemical Engineering Building, completed in 1960, has more than 80,000 square feet and



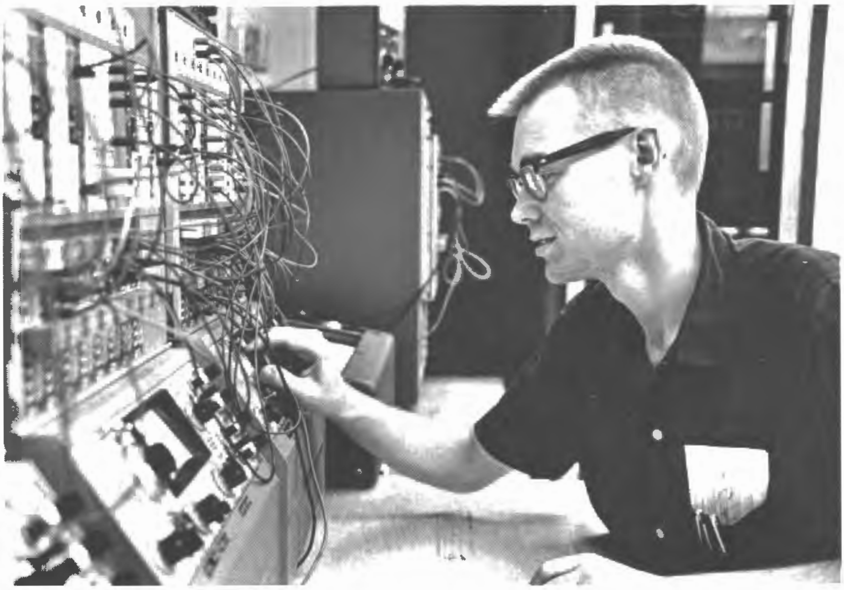
includes 45 research and teaching laboratories and classrooms. Specialized research equipment as well as a noteworthy supply of modern instruments for chemical analysis and physical measurements are available. In addition, Ohio State University with its fine library and advanced computer facilities offers many aids and services so important to quality research and teaching.

Columbus, Ohio, is a center for technical activity. Located near The Ohio State University campus are Battelle Memorial Institute, the largest non-profit research organization in the world, and the Chemical Abstracts Service facilities, the largest abstracting organization in the world devoted to Chemistry and Chemical Engineering. These organizations along with the University and numerous technically-based industries have brought a large number of engineers and scientists to the community.

Graduate education must go beyond the technical requirements listed in the catalogue. Columbus provides a wide range of cultural activities such as those of the Columbus Symphony, the Columbus Gallery of Fine Arts, the legitimate theater, and numerous university-sponsored programs in music, art and drama. For those interested in sports activities, the University offers many opportunities including swimming, tennis, golf and skating.

It is the aim of the Department of Chemical Engineering to offer a flexible graduate program to meet the challenges of a dynamic technological age and to provide the environment for a stimulating and rewarding experience for its graduate students.

Aldrich Syverson



CONTENTS

Master's Program — a presentation of the requirements for completion of the masters program.

Doctorate Program — an explanation of the requirements for completion of the program leading to the Ph.D. degree.

Facilities—a description of the physical facilities available to graduate students seeking either the masters or doctorate degree.

General Information — a general presentation of facilities and policies of the Department of Chemical Engineering and the University in regard to financial aid, employment, and housing.

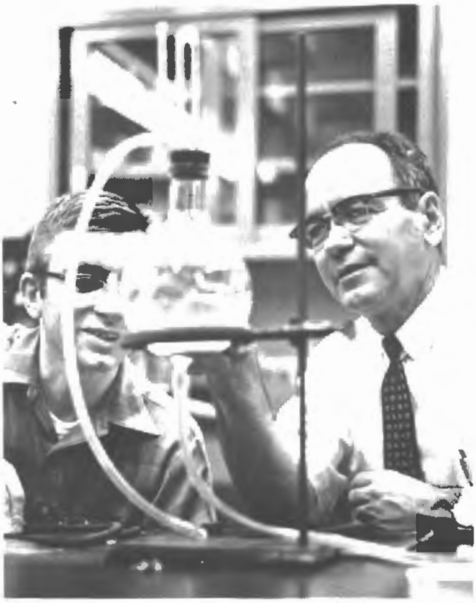
Course Listing — A list of courses now offered in the Department of Chemical Engineering shows the scope and intensity of course work available. Students also elect courses in other departments such as chemistry, physics, and mathematics as well as in other engineering fields.

PROFESSOR CHRISTIE J. GEANKOPLIS (Ph.D., University of Pennsylvania) is discussing with graduate student, Thomas Coffey, the apparatus to study Knudsen and transition diffusion of gases under vacuum. This research is being conducted with binary and multicomponent mixtures diffusing in straight capillaries or porous solids. Professor Geankopolis' other areas of interest include diffusion and simultaneous chemical reaction in liquids and liquids containing particulate matter.

MASTER'S DEGREE PROGRAM

Requirements for the Master of Science degree include 36 credit hours of course work and a thesis in the Department of Chemical Engineering, for a total of 45 credit hours. The course work requirements include completion of a series of basic courses in transport processes, thermodynamics, reaction kinetics, and mathematics; the remainder of the course program is planned with the assistance of an adviser to accommodate the students' needs and interests.

An acceptable thesis and a final oral examination are required to complete the requirements. Most students with adequate undergraduate preparation complete the requirements in one calendar year.



PROFESSOR EDWIN E. SMITH (Ph.D., Ohio State University) is observing Arthur Morth's apparatus used to determine the kinetics of pyrite oxidation. Professor Smith's research interests include water pollution control, nuclear engineering, combustibility studies and petroleum refining.

ASSISTANT PROFESSOR HARRY C. HERSHEY (Ph.D., University of Missouri at Rolla) is setting up a high-speed motion picture camera in order to photograph boundary layer in turbulent pipe flow. Watching is graduate student Geoffrey Lindsey. Professor Hershey's other interests are in the drag reduction of polymer and other non-Newtonian solutions, in optimization, and in mathematical modeling.

DOCTORATE PROGRAM

The program leading to the Doctor of Philosophy degree requires 135 credit hours beyond the Bachelor degree, of which three quarters must be in residence. Students may continue work with the Master's degree adviser, or they will be assigned an adviser early in the Ph.D. program. With the adviser's assistance, the student will plan a program of courses amounting to about 75 credit hours consisting of a required series in basic chemical engineering and mathematics, and a coordinated sequence in special chemical engineering courses as well as in a minor outside the department.

The language requirement is the satisfactory completion of two college-level courses in one foreign language. Written and oral General Examinations are taken after completing the course requirements. Research leading to a satisfactory dissertation and a final oral examination complete the requirements. Most students spend a minimum of three years beyond the Master's degree to complete the Ph.D. program.

PROFESSOR WEBSTER B. KAY (Ph.D. University of Chicago) is shown talking with a Ph.D. student about the critical properties of pure substances and their mixtures. This area of research is part of the overall graduate program in thermodynamics: namely, the measurement and correlation of fundamental data for engineering application.

PROFESSOR EDWARD J. FREEH (Ph.D., Ohio State University) and Peter Bartram are discussing the linkage system being installed to couple three small analog computers to a process control digital computer in the unit operations laboratory. Freeh's interests are principally in the field of mathematical modeling and computer simulation. Areas of application include process dynamics, process design and process control.

PROFESSOR JOSEPH H. KOFFOLT (Ph.D., Ohio State University) discusses with Doug Smith, graduate student, the proposed construction of an extractive distillation unit. Dr. Koffolt's reseach interests in this area involve studies on operating characteristics of an extractive distillation unit and the influence of mixtures containing compounds of the same homologous series on the vapor-liquid equilibrium relationship. Dr. Koffolt served as chairman of the department from 1948 to 1968.

FACILITIES

The Chemical Engineering Building was completed in 1960 at a cost of $2-million; equipment and subsequent improvements have raised the physical plant value to $4-million. The building contains a number of special laboratories such as a physical measurement laboratory; a micro-plant process development laboratory; a Class I, Group D high-ventilation laboratory for polymerization research; a large chemical engineering operations laboratory having a central computer room with digital and analog computers for process control work; a nuclear laboratory; a reservoir engineering laboratory; and an analytical laboratory equipped with gas chromatographs, ultra-violet and infrared spectrophotometers, and a mass spectrometer.

Besides these special laboratories, there are 13 research laboratories equipped for two to four students. A number of special pieces of research equipment are in use, such as PVT appa-

ASSOCIATE PROFESSOR THOMAS L. SWEENEY (Ph.D., Case Institute of Technology) and Paul Jachimiak, graduate student, are discussing a device designed to measure local mass transfer coefficients at a large number of points simultaneously. Professor Sweeney's interests are in the fields of heat and mass transfer, small particle systems, and air pollution.

ASSISTANT PROFESSOR E. R. HAERING (Ph.D., Ohio State University) is shown with graduate student, Juan Kuon, discussing experimental data being taken in conjunction with binary mixture adsorption studies. Dr. Haering's research interests include adsorption, reaction kinetics, catalysis, chemical engineering operations and process design.

ratus, rheogoniometer, mass transfer apparatus for flow in microporous solids, recycle catalytic reactor system, and adsorption apparatus.

In addition to these facilities and services, the department has received valuable research assistance from Battelle Memorial Institute, Wright Patterson Air Force Base, and many industrial companies with whom it has close working relations.

GENERAL INFORMATION

Ph.D. Foreign Language Requirement: All students pursuing a Ph.D. degree must have eight quarter hours (college level) of a foreign language, or the equivalent thereof (determined through appropriate proficiency testing), with a grade of "C" or better. Foreign students are exempt from a language requirement, except that they must be proficient in English.

ASSOCIATE PROFESSOR WALDRON D. SHEETS (M.S., Ohio State University) is examining the miniature activated sludge units which are used in research on oxygen transfer. With him is Robert Roche, graduate student. Professor Sheets' other research interests include water pollution control and investigations of industrial treatment or by-product recovery processes.

Financial Assistance: Most students in the Department receive financial aid in the form of assistantships, fellowships or traineeships. The stipend varies from about $2300 for a three-quarter year appointment to $4800 for a full year of support, depending upon academic attainment and other considerations. All fees are either waived by the University or paid by the Department, except student insurance, parking permits, and the acceptance fee.

Qualified applicants will be considered for teaching or research assistantships, industrial or university fellowships as well as assistance from government supported programs.

Employment for Wives: The University, industrial and business communities in the Columbus area offer good employment opportunities for wives of graduate students.

ALCOA ASSOCIATE PROFESSOR, R. EMERSON LYNN, Jr. (Ph.D., University of Texas) is explaining to Carlos Guttman the need for a pressure rating on a reactor when it is used as a polymerizer. Professor Lynn's areas of interest are polymerization research to develop a better understanding of engineering problems associated with polymerization, polymer recovery from various polymerization media, processing of polymers into useful articles of commerce, and electrodics associated with electro-chemical processes.

PROFESSOR ROBERT S. BRODKEY (Ph.D., University of Wisconsin), whose research can be broadly described as fluid dynamics, is shown here examining the recorded results of an experimental run. More specifically, he is working on a new rheology theory and the characteristics of non-Newtonian materials (shown is the rheogoniometer for these measurements); the interactions between turbulence, mixing and kinetics; and two-phase flow problems such as particle to fluid heat transfer in fluidized beds and the nature of gas-liquid pipe flow. With Dr. Brodkey is graduate student, Kui Lee.

Housing: Married and single graduate students have little difficulty finding adequate housing (furnished or unfurnished), within a reasonable distance of the University. There are also several trailer parks near the University.

In addition, the University's Graduate Residence Hall, with 504 single rooms with bath, and housing both men and women is primarily for the single graduate student who prefers to live and study on campus.

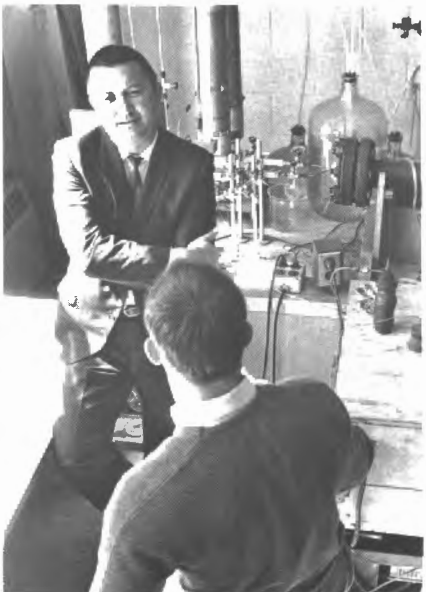
COURSE LISTING

Number	Title
608	Chemical Engineering Thermodynamics I
609	Chemical Engineering Thermodynamics II
611	Elements of Chemical Engineering — Transport Phenomena
612	Chemical Engineering Operations
693	Problems in Chemical Engineering Operations
730	Chemical Engineering Operations Laboratory
761	Chemical Engineering Processes
762	Chemical Engineering Process Development
764	Chemical Engineering Process Design
770	Applied Electrochemistry
771	Air Pollution
773	Introduction to High Polymer Engineering
775	Rheology of Fluids
777	Introduction to Nuclear Chemical Engineering
778	Nuclear Chemical Engineering
779	Chemical Engineering Experimental Design
781	Chemical Engineering Optimization I

PROFESSOR ALDRICH SYVERSON (Ph.D., University of Minnesota), Chairman of the Department, and Richard Stolk, a Ph.D. candidate, are planning a series of experiments in catalysis. The equipment in the background is a complete recycle reactor system. Of particular interest to Professor Syverson in this program is the role of adsorption in heterogeneous catalysis; other areas of interest include transport of adsorbable gases in micro porous solids, adsorption, kinetics at electrode surfaces, process research and process design.

808	Advanced Chemical Engineering Thermodynamics I
809	Advanced Chemical Engineering Thermodynamics II
812	Advanced Chemical Engineering Kinetics I
813	Advanced Chemical Engineering Kinetics II
815.01	Advanced Mass Transfer I
815.02	Advanced Mass Transfer II
815.03	Advanced Binary and Multicomponent Distillation
815.04	Extraction, Azeotropic and Extractive Distillation
815.05	Advanced Heat Transfer I
815.06	Advanced Heat Transfer II
815.07	Drying, Humidification, and Dehumidification
815.08	Advanced Momentum Transfer I
815.09	Advanced Momentum Transfer II
815.10	Advanced Momentum Transfer III

ASSOCIATE PROFESSOR H. C. SLIDER (M.S., Ohio State University) is explaining the equipment designed to determine the fundamentals of miscible displacement in a petroleum reservoir to a graduate student who is ready to initiate work in this area. Research dealing with the fundamentals of miscible displacement of one fluid by another fluid of the same density and viscosity was recently completed. This work will soon be extended to fluids with different viscosities and eventually to fluids with different densities. Professor Slider is in charge of Petroleum Reservoir Engineering instruction and research in the Department.



ASSISTANT PROFESSOR KARLIS SVANKS (Ph.D., Ohio State University) is discussing the accuracy of measurements of adsorption isotherms using the high precision adsorption apparatus. Graduate student, William E. Ferguson is taking a reading. Professor Svank's other areas of interest are: flow of adsorbed gases and vapors through microporous media, water pollution, and development of new or improved analytical methods for analysis of coal.

COURSE LISTING

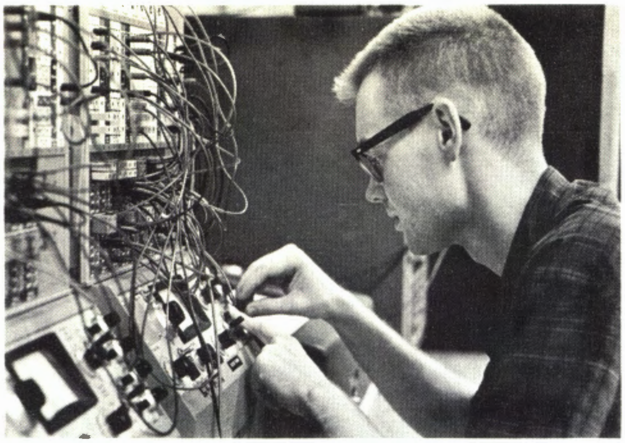
Number	Title
815.11	Advanced Combustion Principles
815.12	Advanced Instrumentation and Process Control of Chemical Plants
815.13	Design of Experiments, Data Handling and Analysis, Quality Control, and Linear Programming
815.14	Advanced Process and Plant Design
815.15	New and Unusual Chemical Engineering Operations
830	Advanced Chemical Engineering Operations Laboratory
861	Advanced Chemical Engineering Processes
862	Advanced Chemical Engineering Process Development
873	Advanced High Polymer Engineering
881	Seminar in Chemical Engineering
999	Research in Chemical Engineering

Petroleum Engineering

542	Drilling Fluids
543	Physical Analysis of Petroleum Reservoirs
544	Oil and Gas Well Completions
641	Reservoir Engineering—Hydrocarbon Phase Behavior
642	Reservoir Engineering—Fluid Flow
743.01	Engineering Problems of Petroleum and Natural Gas Exploration, Production and Transportation
743.02	Design or Planning of Petroleum Field Development
796	Advanced Petroleum Engineering Technology
842	Petroleum Production and Oil Field Development and Operational Problems
999	Research in Petroleum Engineering

IN THIS BOOKLET we have introduced you to the Department of Chemical Engineering at Ohio State University and explained, in brief, the opportunities which await a graduate student who elects to prepare for a career in the vital field of chemical engineering. You may explore further the opportunity which exists for you at Ohio State University by writing directly to Chairman, Department of Chemical Engineering, Ohio State University, 140 West 19th Avenue, Columbus, Ohio 43210. You are encouraged to visit Ohio State University and its Department of Chemical Engineering. If plans permit, call Dr. Aldrich Syverson, (614) 293-6986, and arrange for a personal introduction to Chemical Engineering at Ohio State University.

Ohio State University, now with 40,000 students, is located on a semi-urban 3000-acre campus approximately three miles from downtown Columbus. Columbus, the state capital, is the center of a metropolitan area with a population of one million.



Chemical Engineering

AT THE OHIO STATE UNIVERSITY

What is Chemical Engineering?

Chemical engineering is that branch of engineering concerned with the development and application of manufacturing processes in which chemical or certain physical changes of materials are involved. These processes can usually be resolved into a coordinated series of unit physical operations and chemical processes.

The work of the chemical engineer is concerned with the development, design, construction, and operation of equipment and plants in which chemical and certain physical changes occur. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is its guide in practice.

There are also many processes which involve no chemical reaction but are concerned with the application of physical chemistry, mathematics, and physics.

What Does a Chemical Engineer Do?

Many types of opportunities are open to chemical engineers. These range from the highly technical areas to those that require a modest technical background with special emphasis on other qualifications. Some examples of areas of responsibility follow:

Fundamental Research

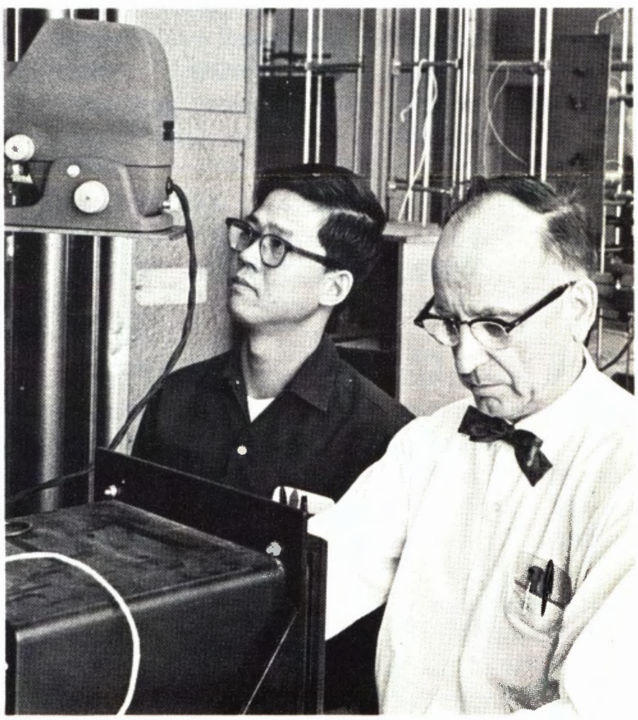
Fundamental research is concerned with the basic studies underlying chemical engineering, the unit operations, and chemical processes. These studies involve chemical engineering kinetics, thermodynamics, and process dynamics, as well as many studies dealing with flow of fluids, heat, and mass transfer.

Applied Research

Applied research is concerned with development of new or the improvement of existing processes and products.

Process Development

Process development is the heart of the work of a chemical engineer. This type of work involves the development of a new manufacturing process when a new product comes from the chemical research laboratory. It takes into consideration the full range of engineering problems, along with economic and cost studies of the process, marketing potential, operating details, and safety.



Design

After it has been shown that a process will be successful on a small scale, the next step is the design of the manufacturing plant which includes special equipment design, instrumentation, air and stream pollution control, and safety. Today, computers are being used extensively for designing and simulating chemical processes.

Production

Chemical engineers play an important role in production since most chemical processes require special technical ability to keep the plant on a productive scale. Men for this type of work must also have good leadership qualities. Personal relations are very important. Safety is always a factor; a chemical plant is usually the safest of all industrial plants.

What Is the Difference Between the Profession of Chemistry and the Profession of Engineering?

Both chemists and chemical engineers are members of the chemical profession by virtue of their basic training, but their points of view are essentially different. A chemist thinks in terms of the laboratory. He employs methods and techniques that are best suited for "micro" or research-level experiments. A chemical engineer thinks in terms of an industrial plant, of quantities in tons and gallons characteristic of a large-scale process. Quite often it is the chemist who makes the discovery of a new material and devises the chemical steps required to make the new product. The chemical engineer is needed to provide the large-scale manufacturing processes. Application in large-scale manufacturing involves further development work in the pilot plant and design of the process, as well as in the equipment and eventual operation of the plant. However, in each step of the intermediate stages of research and development, there will be considerable cooperation and joint responsibility between chemist and chemical engineer.

What Does a Chemical Engineer Study?

The curriculum in chemical engineering is very broad. This is necessary to prepare the student for work in the many facets of the chemical industry. Of the sciences, chemistry is the most important; in this respect, chemical engineering is different from other branches of engineering. A unified sequence of courses in chemistry is scheduled during the first four years, and many students elect to take additional advanced courses in this subject. Other necessary studies are physics; mathematics through differential equations and advanced engineering mathematics; engineering graphics; digital and analog computer studies; English; electrical engineering and electronics; mineralogy; mechanics through strength of materials; metallurgical engineering (corrosion); and chemical engienering courses such as stoichiometry, heat and material balances, the transport properties of momentum, heat and mass, unit operations, instrumentation, process dynamics, thermodynamics, kinetics, chemical technology, economy, process development, design of processes, and individual project investigation.

What Programs Are Available at Ohio State in Chemical Engineering?

The curriculum in chemical engineering is outlined in the *Ohio State University College of Engineering Catalog*. The curriculum is sufficiently broad to set the pace for the rapid advances in this field and its overlapping relationships with other fields of engineering and science. The Department of Chemical Engineering at Ohio State was one of the first ten schools of chemical engineering accredited in 1925 and has held this accreditation since that time.

Facilities

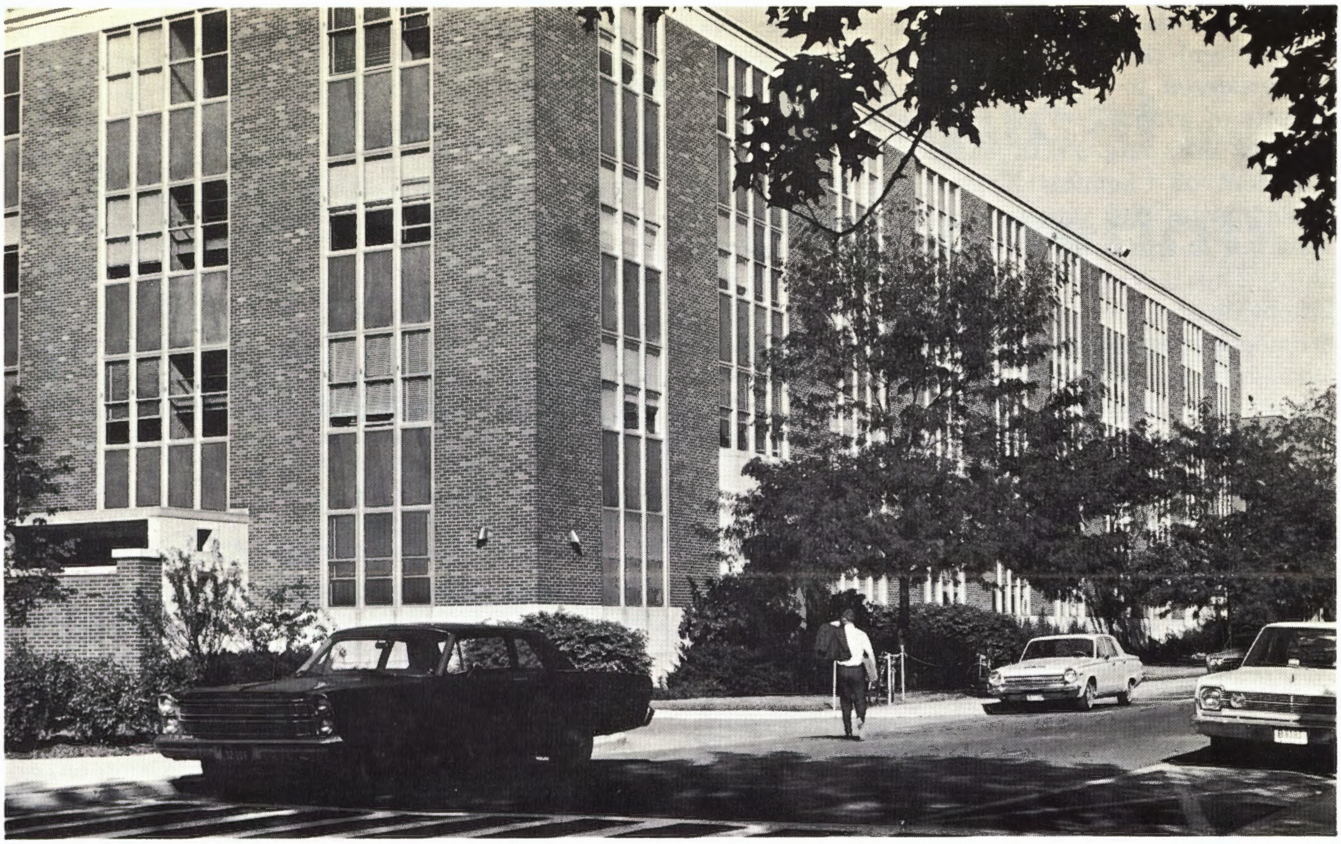
More than 80,000 square feet of floor space has been devoted to chemical engineering. The Chemical Engineering Building at Ohio State is one of the largest buildings in the nation devoted solely to teaching and research in chemical engineering. The equipment in the laboratories is among the best in the country.

Size of Classes

The Ohio State University, with an on-campus enrollment of approximately 40,000, is a large university. Yet within any curricular area, like chemical engineering, the students develop very close personal relationships and identify themselves with their teachers and fellow students. Courses in chemical engineering limit the size of classes in computational and recitational sections to 20-25 students. In the laboratories students work individually or in small groups with individual instruction for each group. The ratio of faculty to undergraduate and graduate students in the Department of Chemical Engineering is 1 to 13.

Technical Electives

Flexibility and consideration for the student is evident in our technical elective program. Consisting of 18 required credit hours, the program



has been designed to place emphasis on one of eight different technical areas, which is selected by the student in consultation with his faculty adviser. The following technical areas of specialization are open to the student:

a. Advanced Engineering and Science—For the student who wishes greater depth in several fields.

b. Environmental Engineering—A field of specialization in air and water pollution and attendant problems.

c. Nuclear Engineering—In this elective area the student studies the physical, chemical, and economic principles applied to chemical process problems. Additional courses may be taken outside the Department in this specialized field.

d. Optimization and Advanced Mathematical Methods—A study of the methods utilized in developing optimal conditions and control for chemical processes.

e. Petroleum Reservoir Engineering—This field of specialization is a concentrated area which covers all aspects of the subject to include a study of the physical nature of a petroleum reservoir, fluid flow, and the quantitative study of the physical nature and phase behavior of subsurface reservoir fluids. The goal is maximum economic recovery of petroleum.

f. Polymer Engineering—An expanding area of study which currently investigates the engineering of polymerization and polymer forming processes, as well as the relationship of engineering properties of high polymers to their molecular characteristics.

g. Process Analysis and Design—A student can specialize in the theoretical and practical aspects of chemical processes of industrial potential. Studies of equipment and plant designs, economic evaluations, and optimum process configurations are included.

h. Process Dynamics and Simulation—This field involves considerable computer work to determine mathematical models of chemical engineering operations and processes to establish most economical designs.

At least 5 credit hours of the technical elective program is taken outside the Department, preferably in other areas of engineering or in the basic sciences. Selection and scheduling of courses is accomplished with the aid of an adviser.

Graduate Work

The graduate program offers a broad selection of courses and a wide range of research areas. Research occupies an important role in graduate education; the close association between the teacher and the student, especially in research, is considered to be one of the most important aspects of graduate work.

Both M.S. and Ph.D. candidates in the Department of Chemical Engineering have many opportunities for financial assistance through teaching or research assistantships and fellowships. This is largely because of the working relationship that the Department enjoys with governmental and industrial organizations which furnish financial support in the form of research grants and fellowships.

What About the Future in Chemical Engineering?

The chemical industry has been a leader in research as well as in its willingness not only to accept, but to foster change. These are the foundations for the continual growth and opportunities in the future. Many of the products of the chemical industry were not on the market, or in many cases even known, 15 years ago. We cannot imagine now what most of the new developments in the future may be, yet there is no reason to expect anything but an increased tempo in innovation.

Some of the important needs on which chemical engineers will work in the future are industrial chemicals, plastics, adhesives, better and cheaper fertilizers, synthetic foods, synthetic fibers, low cost potable water, atmospheric pollution, extraction of chemicals from the sea, and specific needs for space exploration such as durable materials, high energy fuels, energy conversion systems, environmental control systems, etc.

Further Information

For information and application blanks for admission to The Ohio State University, write:

Admissions Office
The Ohio State University
190 North Oval Drive
Columbus, Ohio 43210

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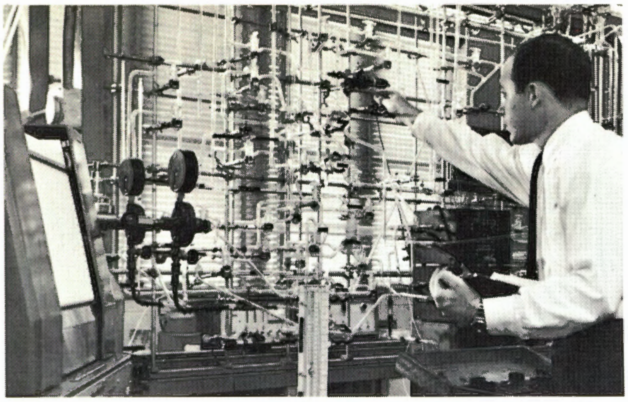
121 Chemical Engineering Building
140 West 19th Avenue
Columbus, Ohio 43210.



Chemical Engineering

AT THE OHIO STATE UNIVERSITY

What is Chemical Engineering?

Chemical engineering is that branch of engineering concerned with the development and application of manufacturing processes in which chemical or certain physical changes of materials are involved. These processes may usually be resolved into a coordinated series of unit physical operations and chemical processes.

The work of the chemical engineer is concerned with the development, design, construction, and operation of equipment and plants in which chemical and certain physical changes occur. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is its guide in practice.

There are also many processes which involve no chemical reaction but are concerned with the application of physical chemistry, mathematics, and physics.

What Does a Chemical Engineer Do?

Many types of opportunities are open to chemical engineers. These range from the highly technical areas to those that require a modest technical background with special emphasis on other qualifications. Some examples of areas of responsibility follow:

Fundamental Research

Fundamental research is concerned with the basic studies underlying chemical engineering, the unit operations, and chemical processes. These studies involve chemical engineering kinetics, thermodynamics, process dynamics, as well as many studies dealing with flow of fluids, heat, and mass transfer.

Applied Research

Applied research is concerned with development of new or the improvement of existing processes and products.

Process Development

Process development is the heart of the work of a chemical engineer. This type of work involves the development of a new manufacturing process when a new product comes from the chemical research laboratory. It takes into consideration the full range of engineering problems along with economic and cost studies of the process, marketing potential, operating details, and safety.

Design

After it has been shown that a process will be successful on a small scale, the next step is the design of the manufacturing plant which includes special equipment design, instrumentation, air and stream pollution control, and safety. Today, computers are being used extensively for designing and simulating chemical processes.

Production

Chemical engineers play an important role in production since most chemical processes require special technical ability to keep the plant on a productive scale. Men for this type of work must also have good leadership qualities. Personal relations are very important. Safety is always a factor; a chemical plant is usually the safest of all industrial plants.

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Both chemists and chemical engineers are members of the chemical profession by virtue of their basic training, but their points of view are essentially different. A chemist thinks in terms of the laboratory. He employs methods and techniques that are best suited for "micro" or research level experiments. A chemical engineer thinks in terms of an industrial plant, of quantities in tons and gallons characteristic of a large-scale process. Quite often it is the chemist who makes the discovery of a new material and devises the chemical steps required to make the new product. The chemical engineer is needed to provide the large-scale manufacturing processes. Application in large-scale manufacturing involves further development work in the pilot plant, design of the process, and in the equipment and eventual operation of the plant. However, in each step of the intermediate stages of research and development, there will be considerable cooperation and joint responsibility between chemist and chemical engineer.

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What Programs Are Available at Ohio State in Chemical Engineering?

The professional division curriculum in chemical engineering is outlined in The Ohio State University Bulletin. The curriculum is sufficiently broad to set the pace for the rapid advances in this field and its overlapping relationships with other fields of engineering and science. The Department of Chemical Engineering at Ohio State was one of the first ten schools of chemical engineering accredited in 1925 and has held this accreditation since that time.

Facilities

More than 80,000 square feet of floor space has been devoted to chemical engineering. The Chemical Engineering Building at Ohio State is one of the largest buildings in the nation devoted solely to teaching and research in chemical engineering. The equipment in the laboratories is among the best in the country.

Size of Classes

The Ohio State University with an on-campus enrollment of more than 35,000 is a large university. Yet within any curricular area, like Chemical Engineering, the students develop very close personal relationships and identify themselves with their teachers and fellow students. Courses in chemical engineering in the professional division limit the size of classes in computational and recitational sections to 20-25 students. In the laboratories, students work individually or in small groups with individual instruction for each group. The ratio of faculty to professional division and graduate students in the Department of Chemical Engineering is 13 to 1.

Technical Electives

By choice of technical electives, there are opportunities for additional studies in areas of individual interest such as chemistry, mathematics, physics, and other related areas.

Nuclear Engineering

The Department of Chemical Engineering participates in the Atomic Energy Commission's Nuclear Science and Engineering fellowship plan. The Department is a part of the University's interdisciplinary nuclear engineering program and it provides some of the courses and laboratory work. Excellent facilities such as a nuclear reactor, radiation sources, and high energy accelerators are on the campus. The University is a member of the Midwestern Universities Association and has the privilege of sending suitable M.Sc. and Ph.D. candidates who have completed course work to Argonne National Laboratories in Lemont, Illinois, for fellowship-supported thesis work.

Petroleum Engineering

The petroleum engineer applies science to engineering in the practical job of producing oil. The goal of his work is maximum economic recovery of petroleum. This means that he must apply his engineering training in such a way that oil operations will be profitable and in the best interest of his company and his country. At Ohio State the chemical engineering student, with interests in this field, may elect to study special courses in petroleum engineering.

Graduate Work

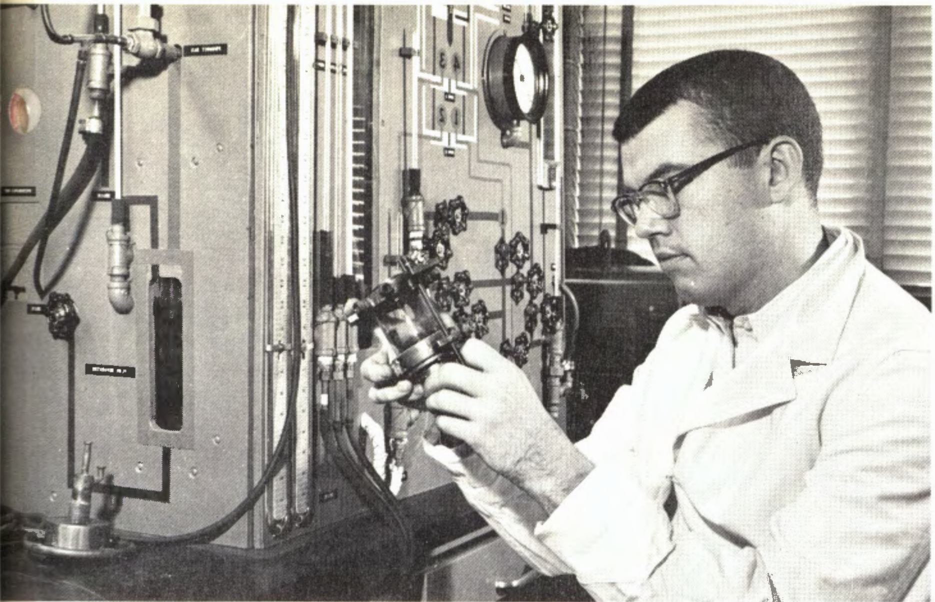
It is possible through Ohio State's five-year program for a student who has a B average (3.0 scholastic point hour) to obtain, in addition to his Bachelor's degree, a Master of Science degree by attending the University for one additional quarter. Some of these men go on for further graduate work to obtain their Doctoral (Ph.D.) degree. The Ph.D. candidate in the Department of Chemical Engineering has many opportunities for financial assistance through teaching or research assistantships and fellowships.

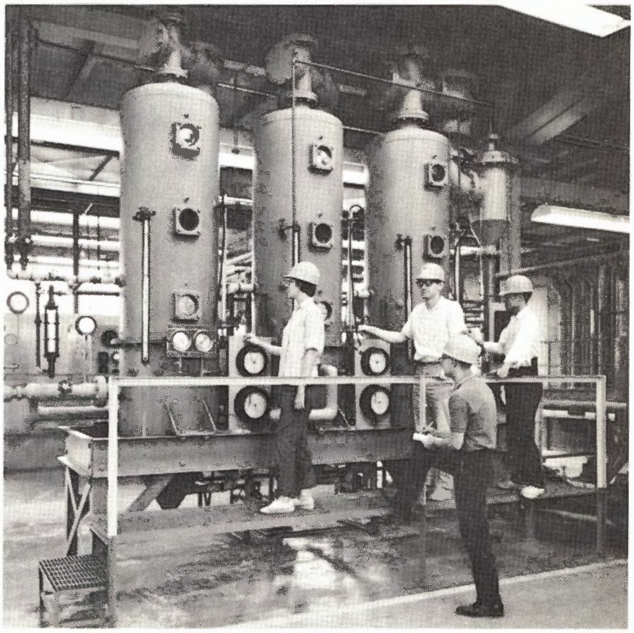
The Department of Chemical Engineering has working relationships with governmental and industrial organizations who support scholarships and fellowships within the Department.

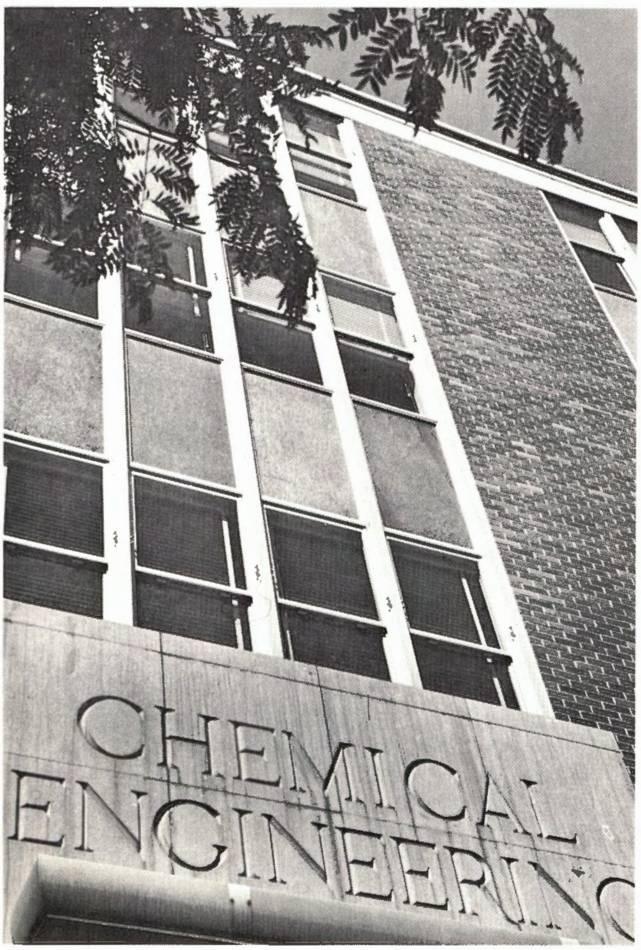
What About the Future in Chemical Engineering?

The chemical industry has been a leader in research as well as in its willingness not only to accept, but to foster change. These are the foundations for the continual growth and opportunities in the future. Many of the products of the chemical industry were not on the market, or in many cases even known, 15 years ago. We cannot imagine now what most of the new developments in the future may be, yet there is no reason to expect anything but an increased tempo in innovation.

Some of the important needs on which chemical engineers will work in the future are: industrial chemicals, plastics, adhesives, better and cheaper fertilizers, synthetic foods, synthetic fibers, low cost potable water, atmospheric pollution, extraction of chemicals from the sea, specific needs for space exploration such as durable materials, high energy fuels, energy conversion systems, environmental control systems, etc.







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102 Administration Building
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APPENDIX

APPENDIX I

PLANNING THE CHEMICAL ENGINEERING BUILDING

By

Joseph H. Koffolt* and Aldrich Syverson**

* Chairman, Chemical Engineering Department, The Ohio State University, Columbus, O
** Professor, Chemical Engineering, The Ohio State University, Columbus, Ohio

Introduction. This chapter gives the details concerned with the new $2,400,000 Chemical Engineering Building at the Ohio State University. It now houses all of chemical and petroleum engineering and some of metallurgical engineering. The second phase which will cost another $2,000,000 will complete the facilities for all of the branches of the chemical phase of engineering including metallurgical and mining engineering, ceramic engineering and minerology. It is integrated in both the Engineering and Chemical Center of the University. $7,700,000 is contemplated in the next few years for the college's ten year building program which began in 1954 and which eventually will include all other departments of the college either by new buildings or remodeling of present buildings. The prime mover of the $12,000,000 revamp of Ohio State's engineering facilities was Vice President Gordon B. Carson who was Dean of Engineering from 1953 to 1958.

Preliminary Planning. The department of chemical engineering was assigned to "temporary" space in the new McPherson Chemical Laboratory in 1925 with the hope that in the very near future it would have a building of its own. As a result of this at least 15 designs of a new chemical engineering building were completed by the students and staff. Late in 1955 it finally appeared that the new building would be a reality. It was thought best to obtain first hand information and visit as many university and industrial laboratories as possible. At least twenty industrial laboratories and about the same number of recent chemical engineering university buildings were visited and studied. All were very co-operative in giving information, furnishing blue prints and complete descriptions of their laboratories. In addition to this, the book Laboratory Designs published in 1951 gave much useful information. With this background of information the actual planning of the building was started.

The Actual Planning of the Building. In anticipation that the new building would at last be a reality, the actual planning of the building was begun November 18, 1955. This was done as a joint and cooperative effort of the staff of the department. Each staff member was given a specific assignment and the responsibil of a specific phase of the building. Their ideas were integrated at meetings held nightly, each lasting from four to five hours and covering a period of at least one month. An appraisal of the good and poor features of the present space as well as a critical analysis of the ideas gathered from visits, correspondence, and blue prints of other chemical engineering industrial and university laboratories. A list too was made of the number and types of laboratories and offices needed. These totaled eighty eight. Some of the special laboratories were: Precision Standards, Thermodynamics or Physical Measurements, Optical, Kinetics, Mass Transfer, Nuclear, Design, Unit Operations, etc.. Detailed specifications, including sketches of the laboratory furniture, utilities, space, safety provisions were written for each laboratory. The total space, exclusive of hallways, storage and utility service space, totaled 82,000 square feet.

Early in 1956 the architectural firm of Small, Smith, Reeb and Draz of Cleveland was commissioned to make the final plans, the detailed specifications, an the finished blue prints of the building. $86,000 was allocated for this purpose. It soon appeared that the $2,400,000 which was allocated would not be adequate for the 88 laboratories and offices. It was therefore necessary to revise the original plan. The next step was to integrate the work of the staff to give the architect information for preliminary planning and lay out work. This resulted in a 132 page report which provided a basis for all future planning and decisions.

The first preliminary plans for the building were submitted by the architects November, 1956. These did not meet the specifications and layout desired. Many other meetings were held subsequently in which the preliminary layouts were revised. Finally, in June, 1957, the overall building plans were crystallized and jelled. During this period also final details such as, power and utility requirements, floor loads, telephones, safety features, air conditioning, location of equipment in the Unit Operations Laboratory and the type and overall dimensions of built in laboratory furnishings as, tables, racks and hoods were specified quantitatively.

The first detailed semi-official blue prints of the building were received July, 1957. Once again these were checked and rechecked by members of the staff. Their comments were integrated in detailed reports. The final revised plans together with 200 pages of detailed specifications were approved by the Board of Trustees of the University in early September, 1957. The building proper then went out for bids. The firm of Baker and Combs Company, Morgantown, West Virginia was awarded the general contract for the building. Demolition of the temporary laboratories on the proposed site of the building began December 1, 1957. Ground was broken January 16, 1958. The target date for the completion of the building was February,1, 1959, but due to strikes and other factors the building itself was completed June 1, 1959.

With the building "per se" underway September, 1957, detailed work was started again on the built-in equipment. A laboratory equipment company was contacted concerning the detailed specifications of built-in laboratory furniture.

Once again each staff member was given the responsibility for certain laboratories. This took one solid week. It resulted in 43 pages of specifications of single spaced typing. The original estimate was $390,000. It went out for bids in October, 1958. Ten companies submitted bids ranging from a little over $200,000 to a little less than $290,000. The Metalab Company, Hicksville, New York was awarded the contract on November 28, 1958. Once again, there was a series of meetings with the staff and the Metalab Company on the details of the blue prints submitted by them. This also resulted in voluminous reports concerning these details. The target date was August, 1959, but due to many delays cause by strikes and other factors all of the laboratory equipment was finally completed April, 1960. However, some of the laboratories were completed in late 1959. The Board of Trustees accepted the building for the University on May 5, 1960.

A complete and detailed photographic history of the building was made. This included the temporary buildings on the site, demolition of these buildings, the excavation, pouring of the concrete floor by floor, the steel structure for the Unit Operations Laboratory, the many miles of piping before it was covered with transite or acoustic type ceiling, and every finished laboratory.

General Design of the Building The general design of the building is illustrated in Figure 1. It is L shaped. Figure 2 illustrates the architect's concept of the completed building which will be E shaped. The back-up consists of concrete block of the lightweight type, which is not cinder block. The columns are on 20 foot centers and are poured concrete with reinforcing steel. This is also true of the floors. The Unit Operations Laboratory is of structural steel, the floors of which are of three types: reinforced steel and concrete, steel plate, and steel grating. The hallway walls are of glazed tile with matching vinyl tile flooring. The flooring in most of the laboratories is asphalt tile. The spandrel panels are Virginia Greenstone, The limestone block is variegated, hard select buff of the Indiana type.

The floor plans of the six floors of the building, which include the basement and pent-house, are illustrated in Figures 3 to 8. Table I gives a summary of space allocation for each floor; Table II is a summary of the space for laboratories offices, class-rooms and storage space.

Special Functional Areas. Figures 9 to (?) (Depending on how many photographs are used) illustrate some of the laboratories.

Nuclear Engineering Laboratories (Rooms 29, 33, and 35) Nuclear laboratories are installed in the basement of the new Chemical Engineering Building so that Chemical Engineering students will be provided with modern facilities to carry out class laboratory experiments and research work using radioactive isotopes and radiation.

The laboratory consists of four rooms with connecting doors. The dressing room contains a shower and monitoring facilities. From this dressing room a low level radiochemistry laboratory is accessible. Here work is done on Chemical Engineering problems, using tracers at the microcurie level. Conventional isotope laboratory benches and hoods of the bench type and walk-in style are available. The high-level laboratory is adjacent to the low level laboratory and contains the same facilities. Work involving higher level activity experiments in the multicurie range is confined to this laboratory. A counting room separately connected to the entrance and dressing room is available for precise counting work.

The walls of the entire laboratory are concrete block covered with special Amercoat paints to provide an impervious undercoating and a peelable outer layer. The floors are covered with asphalt tile since a continuous linoleum covering could not be laid at the basement level. Room ventilation is designed to produce the highest negative suction pressure in the high level laboratory so that the net air movement is towards the direction of highest activity.

These facilities are available for some of the laboratory requirements for the course Ch.E. 766, the second of a two course sequence in Nuclear Chemical

Engineering. The purpose of the laboratory portion of Ch.E. 766 is to survey a few of the more important phases of instrumentation methodology, and equipment design and operation which chemical engineers will encounter in the nuclear industry.

Gamma Radiation Pool Facilities (500 curie Cobalt-60). A small pool facility measuring 3 feet by 6 feet by 10 1/2 feet deep is located in a fenced off section in the south-east corner of the chemical engineering building. The 500 curie source is divided into twelve pencil type capsules measuring 5/8 inch diameter by 8 inches. This is located at the bottom of the pool in a holder designed such that various radiation configurations are possible. There is a 10 foot water shield above the surface of the pool. Gamma detector is located just above the pool as a warning device. Radiation experiments at various pressures and temperatures can be conducted by extension pipe and electric heating wire connected to the equipment which is to be radiated.

The experiments which will be done by students in the Nuclear Laboratory are:

1. Nuclear radiation detection
2. Isotope dilution assay methods
3. Pulse column extractor performance
4. Ion-exchange separation
5. Gamma radiation

Process Development Pilot Plant Laboratory (Rooms 118-218) is designed for carrying out small pilot plant scale studies in connection with the Process Development courses. Micro-scale process studies will be carried out in other laboratories (Kinetics and Process Research Laboratory, General Laboratory, or Graduate Research Laboratories). This laboratory will be used primarily to confirm micro-scale results as well as to prepare larger quantities of special chemicals required for research and other course work.

The important equipment includes a 10 gallon glass lined reactor-distillation unit and a similar 30 gallon stainless steel unit. The glass lined unit is equipped with a 3 inch Pyrex Oldershaw sieve tray column which can be set up for ten to sixty plates in multiples of ten. A three stage evactor is so arranged that it can be connected to either unit for vacuum operation.

All electrical equipment is of the Class I Group D type and the room is designed with air-locks and suitable ventilation for handling combustible materials. To conserve space and still provide height for distillation columns, a ten foot wide section of one end of the room is two floors high.

Micro Process Development and Kinetics Research Laboratory (Room 307) is used for research in the field of heterogeneous catalysis and related fields as well as for micro-scale process research. The laboratory has two eight foot walk-in hoods for the operation of process units that require isolation. Apparatus is mounted on portable racks that can be moved into the hood. A distillation rack in the center of the room provides additional space for carrying out similar work that does not require isolation.

The Physical Measurements, Thermodynamic and Phase Laboratories (Rooms 412 and 431).

The Thermodynamics or Physical Measurements Laboratory has been planned and equipped specifically for the study of the P-V-T relations of pure compounds and mixtures. Space is provided for eight students to work on P-V-T properties covering a pressure range from atmospheric pressure to 150 atmospheres and temperatures from 0° to $300^{\circ}C$. Each working space is provided with a connection to a high precision dead weight gage so that secondary pressure gages may be checked at any time. Thermocouples used in conjunction with high precision potentiometers are used for temperature measurement. A platinum resistance thermometer together with a high precision bridge is available for calibration of the Thermocouples.

As accessory facilities for the P-V-T work two racks, 14 feet long, have been provided upon which to mount distillation and high vacuum equipment for the purification and the degassing of liquids and the preparation of mixtures of known composition. A walk-in ventilation hood is available for use when highly toxic materials are to be studied. Two separate rooms in this Thermodynamic laboratory are provided for the storage of equipment and supplies.

The Phase Laboratory houses special equipment for the study of the phase behavior of mixtures at pressures up to 10,000 pounds per square inch. This equipment is being used principally for graduate research.

Mass Transfer Laboratory (Rooms 332, 332A, and 332B) is used primarily for resear in the mass transfer operations of liquid-liquid extraction, absorption, diffusio from solids and diffusion from liquids. The laboratory is so constructed that in one end of the room equipment two stories high can be accomodated. Facilities for spot exhausting of fumes are included as are a table hood and a walk-in hood.

The laboratory will accomodate 8 to 10 graduate students working on separate research problems. At present, the following problems are being investigated:

1. Longitudinal diffusion in packed beds using frequency response techniqu
2. Diffusivity of high molecular weight solids in liquids.
3. Extraction of metal salts in aqueous solutions.
4. Heat and mass transfer in liquid-liquid systems.

Mass transfer work requiring low level radio-isotopes is done in special Graduate Laboratories as Room 405 or in the Nuclear Laboratories.

The Computer Laboratory (Room 314) is designed to accomodate small computers with auxilliary equipment. The room is air conditioned and is furnished with tables, stands, and cabinets suitable for each piece of equipment. At the present time, two Heathkit analog units along with auxilliary equipment such as

Oscilloscopes, function generators, x-y plotters, multipliers, etc. are used primarily for teaching purposes. The room will also accomodate a small digital unit or certain peripheral equipment for a larger unit.

Reservoir Engineering Laboratory (Room 427) is used for oil and gas production studies and investigations. It has facilities for phase behavior, and multiphase flow in porous media. The reservoir engineering lab is equipped to measure two general types of data, (1) those concerned with the physical nature of the complex porous reservoir media, and (2) those concerned with the reservoir fluid properties and phase behavior.

A virtually complete analysis can be made of a reservoir rock sample including sample preparation with diamond cutting instruments and measurement of porosity, permeability, saturation, resistivity, capillary pressure, and displacement characteristics. The lab is equipped with a variable volume pressure cell and temper ture bath which permits placing the reservoir fluids in an environment which duplicates the natural reservoir pressure and temperature. The phase and viscosity variations with pressure and temperature can then be measured.

The laboratory is used for undergraduate and graduate instruction and research investigations.

Drilling Fluid Laboratory (Room 103). The laboratory is used for undergraduate instruction and graduate research in the control of drilling fluid properties such as apparent viscosity, plastic viscosity, fluid loss, gel strength, weight, studies on the application of non-Newtonian theories, etc.

Optical Laboratory (Room 210) This laboratory was designed for conducting instrumental analysis for research and instruction. The types of analytical instruments now in service include: infra red, ultra violet, and ratio recording spectro photometers, gas chromatograph, polariscope, microscope, etc. This laboratory is air conditioned.

Precision Standards Laboratory (Room 434). The Precision Standards Laboratory serves as a facility for primary standard of measurement. It provides means for checking temperature, pressure, density, viscosity, volume and mass. Both room temperature and humidity are controlled to reduce environmental variables for standardization.

Glass Blowing Laboratory (Room 432). This is a service laboratory for students and staff. The laboratory is equipped with glass blowing facilities for construction and repair of glass apparatus for instruction and research.

Solvent Storage Building (Room 100). It was deemed unsafe to store quantities of combustible solvents anywhere in the building. A separate building 20 ft. by 30 ft. was built in the "L" opening of the main building and at least ft. from it. The solvent storage building is of fireproof construction and is equipped with Class I Group D electrical fixtures, fans for high level ventilation, safety showers, and floor drainage to permit rapid washing in the event of spillage or an accident. Containers up to 55 gal. drum size can be stored.

Graduate Research Laboratories. In addition to the above laboratories which are designed for specific areas of research and teaching, there are eighteen general purpose research laboratories. All of these are about the same size and design, except for minor variations in arrangement and amount of apparatus assembly racks. Each room will accomodate two to four graduate students depending upon the complexity of the apparatus. The principal laboratory equipme in each room includes a "walk-in" type hood, a bench type hood, laboratory benches, apparatus racks, cabinets and desks. The average size is 20' X 20'.

Versatility and safety were important considerations in the planning of these laboratories. Each room has an escape door to an adjacent room and a safety shower near the door leading to the hallway. At the present time, researc in the fields of turbulence, fluidization, rheology, catalysis, mass transfer, and absorption is being carried out in these laboratories. It should also be pointed out that other laboratories such as Unit Operations and Furnace and Pyrometry are also used for research as well as instruction.

Unit Operations Laboratory (Rooms 117, 217, 317, and 417). These laboratories are used for undergraduate and graduate laboratory teaching in the unit operations, applied instrumentation, pilot plant work in the process development courses, and for research and theses problems which require head room and other special facilities available in these laboratories.

There are three balconies or mezzanines surrounding the central well served by an electrically operated five-ton American Monorail "Monotrack" crane. The central well is 16 feet wide and 83 feet long. The three mezzanines are located at 16', 12', and 12' heights thereby giving four working floors off of a central well. The head room is 40 feet for three of the floors and 52 feet for the South mezzanine . The West mezzanine is 7 feet-6 inches wide and is 103 feet long. The floor is removable steel grating which permits the installation of tall equipment. The East mezzanine is 38.5 feet wide and consists of three types of floors: (a) open steel grille floors, 7 feet-6 inches wide, on the cantilevered balcony, (b) steel plate floor, 9 feet-6 inches wide, and (c) poured reinforced concrete floor, 21 feet-6 inches wide so pitched to provide drainage to open trenches covered with steel grating. The South mezzanine is steel grating covering the open well end and runs the entire width of this laboratory.

Utilities and Services . These include the following:

Steam is generated at the University Power House and is piped to the building. The total available quantity of steam is 13,300 pounds per hour and at a pressure of 160 psi (g). This is reduced at the building to pressures of

5, 30 and 125 psi. Of this steam, 9,000 pounds per hour is for heating and the remainder is for the various laboratories.

Water to the building is supplied from 6-inch feeder main at a pressure of 60 psi (g). This includes all cold water for all of the laboratories, wash rooms, and fire hydrants. The fire hydrant water line branches off from the main to a 4" line, the valve of which is locked and can not be closed except by the University fire marshall. There are also 1-inch and 2-inch hot water lines for wash rooms, showers and process work.

Distilled water is obtained from a Barnsted still Model No. SMG-20 (20 g.p.h. capacity) located in the pent house (sixth floor). Distilled water is supplied to the various laboratories by a 3/4" aluminium line.

Gas is supplied to the building through a four inch line and is at a pressure from 6 to 8 ounces.

Air to all the laboratories with the exception of the Unit Operations lab is supplied from the University Power House through a 1-1/2" line and at a pressure of 80 psi (g). This is further reduced to 30 and 5 psi (g) depending upon the type of air service required.

The air supply to the Unit Operations Laboratory is independent of the University line. There are three compressors and/or blowers in the U.O.L. mechanical room (Room 14). Data concerning these are:

Pressure	Quantity c.f.m.	Type of Equipment
125 psi (g)	240	Ingersoll-Rand 10" x 9" Model ESH with a vertical 30" x 7'-0" vertical air receiver.
7 psi (g)	200	Roots-Connerville rotary positive displacement air blower.
25" water	2200	American Blower 6-24 Type F fan with a Rockwell SA206 blast gate type damper on the outlet of the blower.

Electrical Service . The primary supply to the building is 3 phase, 3 wire, 13,200 volts. The secondary voltage is 3 phase, 4 wire 120/208. The transformer vault (see basement plan) anticipates 3-500 KVA transformers, for power in the future. At the present time there are 3-333 KVA single phase, oil immersed, and self cooled.

Bus duct runs, both plug-in-type and feeder type are used in the Unit Operations Laboratory, Furnace Rooms and Shop. Receptacles for all of the other laboratories are three prong polarized and grounded.

Exhaust Fans There are a total of 65 exhaust fans manufactured by the American Blower Company for the various hoods and rooms which require fume exhaust. Each of these fans has its own individual motor and exhaust duct. All of these fans have aluminium wheels and the fan scrolls are Neoprene protective coating. Most of the fans have spark proof wheels and explosion-proof motors. All of these are located in the Pent House of the building with the exception of two which are on the roof and are weather-proof. The capacities vary from 250 to 27,000 cfm.

Air Conditioning . All offices, class, lecture, confernece, dark and duplicating rooms are air conditioned; as are the computation, computer, precision standards, and optical laboratories. The conditioners are of the chilled water type. The chilled water generator is an Acme, "Flow Therm" Packaged Liquid Chiller" using Freon-22 as a coolent. The cooling towers are also Acme, No. AT-30, with multi-fan section, spray chamber and water reservoir. With the exception of the lecture room (207) and the precision standards unit, all of the units are of the Modine type, hung from the ceiling and provided with sound absorbing bases.

Safety held the highest priority in the design of the building. All laboratories have a second escape door and an emergency shower actuated by a manual Logan rod. Each hood is connected to a separate exhaust fan located either on the roof or in the Penthouse of the building. Each floor is equipped with wall hydrants, fire extinguishers of various types, cabinets for gas masks, fire blankets, stretchers, and first aid kits; fire alarm systems are located on each floor. A special sump is connected to the Unit Operations Laboratory floor drain system for diverting insoluble or hazardous organic liquids which might be spilled accidently on the floor from the sewer system. Provisions are also made for venting all inflammable vapors, waste process steam, entrained liquids, and non-condensible gases to the roof; appropriate containers on the roof of the fourth floor are provided.

Spot ventilation using movable canopy hoods is provided by ducts running the entire length of the Unit Operations laboratory, and also on all floors, and the Process Development Laboratory. The exhaust ducts are sized from 10" x 10" on the far side to 24" x 12" on the near side of the blower. Connection from the canopy hood to the duct is made by flexible hose to 6" nipples in the ducts. The exhaust fan for the unit operations lab is of the American Blower type (Size S 222 J.K.) with a capacity of 5300 cfm at 1-1/4" static pressure. The Process Development exhaust fan (Size S150FO) has a capacity of 5300 cfm at 1" static pressure. The wheel is spark proof and the motor is explosion proof. Both of these fans are located on the roof of the building.

Fire Alarm System is a complete, closed circuit, electrically supervised fire alarm system, continuous ringing, causing signal to sound all stations together. There are fire alarm pull station of the break glass type on each floor. There is also a manual operating rod running through all floors. It is equipped with switch to initiate the closed circuit supervised system, and arrange to manually operate a 10 inch gong.

Other Pertinent Features of the Building

Telephone Systems: All offices have telephones on independent numbers, however, there is also a signal in the departmental office when anyone of the offices is called. If the call is not answered in a reasonable time the message is taken in the departmental office and the message is put in the post office box of the particular staff member.

Dictation: There are "Soundscriber" telephones in each office. Letters, reports and other communications are dictated through these telephones to the departmental office where they are typed.

Student Facilities: There are individual lockers for each student and also showers. In addition to the conference room (Room 221B) which is used for faculty, committee meetings, and oral examinations for Master's and Doctor's degrees; there is also Room 436 which is used for the Student Branch of the AIChE and also a computation and study room.

Paging System: Speakers are installed on each floor with the microphone located in the departmental office.

Vacuum Cleaning System: A "Vacuslot" floor type system is installed with outlets located in several places on each floor.

Lighting System: Lighting is such that in no room is it necessary to have auxilliary desk lamps. The recessed fluorescent lamps are rapid start, warm white.

The Elevator: An 8000 lb. capacity Otis elevator serves five of the six floors. The elevator is automatic with a 6' x 8' platform and operates at a speed of 100 ft/min.

TV Conduit System: Provisions are made anticipating closed circuit TV by the installation of an empty conduit system running from most of the laboratories to the lecture and class rooms.

Clocks* of the synchronous type are installed in all hallways, lecture and class rooms and some of the larger laboratories. These clocks are either single or double spaced and are 12" in dia meter.

Program Bells are 8 inch and 120 volt and arranged for control and supervision from the main campus control system.

CHEMICAL ENGINEERING BUILDING
TABLE I

Summary of Space Allocation by Floors
(Room Numbers Are Given in Parenthesis)

A. Basement	Room No.	Net Sq. Ft.
1) Mechanical Service Equipment Rooms	(14-28)	2,040
2) Storage Rooms and Lab. Supply Rooms	(3-23-32B)	4,780
3) Nuclear Labs.	(29-33-35)	1,420
4) Machine Shop	(32)	1,360
5) Shop Storage	(32A)	700
TOTAL BASEMENT		10,300
GROSS SQUARE FEET		11,510

B. First Floor	Room No.	Net Sq. Ft.
1) Unit Operations	(117)	5,650
2) Process Development	(118)	635
3) Electro-Chemistry	(110)	830
4) General Laboratories	(103)	2,510
5) Drilling Fluid	(130)	610
6) Production Lab.	(132)	640
7) Graduate Lab.	(133)	420
8) Chem. Engrg. Dept. Offices	(121)	500
9) Metallurgical Engrg. Dept. Offices	(125-129)	725
10) Pyrometry (Met. Eng.)	(136)	600
11) Metallography (Met. Eng.)	(134)	605
12) Heat Treatment (Met. Eng.)	(131-135)	1,100
13) Hazardous Materials Storage	(100)	490
14) Outside Laboratory Cement Floor Platform		1,200
TOTAL FIRST FLOOR NET		16,515
GROSS SQUARE FEET		19,338

C. Second Floor	Room No.	Net Sq. Ft.
1) Unit Operations	(217)	4,600
2) Process Development	(218)	200
3) Lecture Room	(207)	1,255
4) Classroom	(205)	625
5) Instrument Supply	(203)	180
6) Graduate Labs	(214-225-229-235)	1,680
7) Optical Laboratory	(210)	420
8) Duplicating Room	(208)	205
9) Dark Room	(206)	220
10) Conference Room	(221B)	270
11) Offices (3)	(221A-221C-221D)	500

C. Second Floor (cont'd)	Room No.	Net Sq. Ft.
12) Visual Microscope Room (Met. Eng.)	(230)	590
13) Graduate Photo-micrograph Room (Met. Eng.)	(236)	620
14) Polishing Rooms (2) (Met. Eng.)	(231-233)	840
15) Metallography (Met. Eng.)	(232)	1,300
TOTAL SECOND FLOOR		13,505
GROSS SQUARE FEET		16,375

D. Third Floor	Room No.	Net Sq. Ft.
1) Unit Operations	(317)	4,800
2) Process Research and Kinetics	(307)	1,270
3) Graduate Labs (4)	(325-329-331-305)	1,570
4) Group Computation-Conference Labs (4)	(306-308-310-312)	880
5) Class Computation Lab	(336)	600
6) Computer Lab.	(314)	410
7) Classroom	(330)	590
8) Mass Transfer	(332)	1,260
9) Drafting and Process Design Lab.	(321D)	420
10) Offices and Waiting Rooms (6)	(321B-321C-333A,-333B-335A-335B)	1,300
11) Laboratory Supply Storage	(303)	270
TOTAL THIRD FLOOR		13,370
GROSS SQUARE FEET		16,375

E. Fourth Floor	Room No.	Net Sq. Ft.
1) Unit Operations	(417)	1,360
2) Group Computation-Conference Labs (2)	(414-416)	410
3) Class Computation Lab.	(436)	590
4) Furnace, Pyrometry Room	(407)	1,240
5) Graduate Labs (3)	(405-423-433)	1,470
6) Thermodynamics and Physical Measurement Labs.	(412)	1,480
7) Glass Blowing Lab.	(432)	420

(CONTINUED ON NEXT PAGE)

TABLE I (cont.)

Summary of Space Allocation by Floors (cont'd.)

E. Fourth Floor (cont'd)	Room No.	Net Sq. Ft.
8) Precision Standards Lab.	(434)	420
9) Mass Transfer Lab.	(403)	400
10) Phase Lab.	(431)	420
11) Petroleum Reservoir Eng. Lab.	(425)	860
12) Office (5)	(421A-421B-421C-435A-435B)	840
13) Instrument Supply		150
14) Mechanical Room	(417A)	595
TOTAL FOURTH FLOOR..........		10,655
GROSS SQUARE FEET...........		13,376

F. Penthouse		
1) Mass Transfer	(532)	100
2) Mechanical Service Equipment Room	(501)	4,350
TOTAL PENTHOUSE - NET AND GROSS...............		4,450

G. Summary	Net Sq. Ft.	Gross Sq. Ft.
1) Basement	10,300	11,510
2) First Floor	16,515	19,338
3) Second Floor	13,505	16,375
4) Third Floor	13,370	16,375
5) Fourth Floor	10,655	13,376
6) Penthouse	4,450	4,450
TOTAL	68,795	81,424

TABLE II

CHEMICAL ENGINEERING BUILDING

Summary of laboratory, Offices, Classrooms and Services

I. Chemical Engineering Division	Head Room Feet	Floor Space Sq. Feet
A. Laboratories		
1. Unit Operations Laboratories	40-52	16,410
2. Mechanical Service Equipment Room	12	430
3. Process Development Laboratories	16-28	835
4. Process Research and Kinetics	12	1,270
5. Nuclear Laboratories	12	1,420
6. Electro-Chemistry	12	830
7. General Laboratories	12	2,510
8. Mass Transfer	12-36	1,760
9. Thermodynamics and Physical Measurements	12	1,480
10. High Temperature and Pyrometry Lab.	12	1,240
11. Optical Laboratory	12	420
12. Glass Blowing Laboratory	12	420
13. Precision Standards	12	420
14. Graduate Laboratories (12)	12	5,140
15. Computation Laboratories (8)	12	2,480
16. Phase Laboratory	12	420
17. Computer Laboratory	12	410
18. Petroleum Production Engineering - Drilling Fluids Laboratory	12	610
19. Petroleum Production Engineering - Production Laboratory	12	640
20. Petroleum Production Engineering - Reservoir Engineering Laboratory	12	860
21. Process Design Drafting Laboratory	12	420
TOTAL		40,895
B. Offices and Classrooms		
1. Offices (17)	10	3,140
2. Lecture Room	9-10	1,255
3. Classrooms (2)	10	1,215
4. Conference Room and Graduate Examination	10	270
TOTAL		5,880
C. Services, Storage and Miscellaneous		
1. Duplicating and Dark Rooms	10	425
2. Shop	10	1,360
3. Storage Rooms, Instrument Supply	10	6,080
4. Outside Hazardous Storage Building	12	490
5. Outside Laboratory Cement Floor Platform	--	1,200
TOTAL		9,555

TABLE II (cont.)

Summary of Laboratory, Offices, Classrooms and Services (cont'd.)

	Head Room Feet	Floor Space Sq. Feet
II. Metallurgical Engineering Department		
1. Offices (4)*	10	725
2. Heat Treatment Laboratories (2)	12	1,100
3. Metallography Preparation	12	605
4. Visual Microscopic Laboratory	12	590
5. Metallography Laboratory	9-10	1,300
6. Polishing Laboratory	12	420
7. Intermediate Polishing Laboratory	12	420
8. Graduate Photomicroscopic Laboratory	12	620
9. Pyrometric Laboratory	12	600
TOTAL		6,380

*To be assigned to Chemical Engineering when other two phases of the building are completed.

III. Hallways, Restrooms, Janitor's Closets Elevator, etc.	12,629
IV. Mechanical Equipment	
1. Mechanical Equipment Room - Basement	1,610
2. Mechanical Equipment Room - Penthouse	4,350
3. Mechanical Equipment Room - Fourth Floor	595
TOTAL	6,555
V. Overall Summary	
1. Total Net	68,795
2. Grand Gross Total	81,424

ACKNOWLEDGEMENT

We owe so much to so many. The excellent facilities of the building would not have been possible if it wasn't for the high degree of cooperation of the persons listed below, and many others.

We will always be indebted to Vice-President Gorden B. Carson, who as Dean, made the building possible. Associate Dean Robert S. Green for the many hours in checking, advice, and going over the many details. Dean Harold A. Bolz for the excellent support given us as Dean.

To the staff members of our Department of Chemical Engineering, as Professors Kay, Geankoplis, Dryden, Brodkey, O'Rourke, Slider, and Instructors Dr. Lillian Golub, Wilhelm, Haering and Chase. This building was 100% teamwork and everyone carried out his task with perfection.

We are also appreciative to the many Universities for the help they gave us. Some of the people at these schools are Professors Schoenborn, Pigford, Gerster, Simons, Johnstone, Drickhaemer, Ragatz, Hougen, Neil, Rhodes, Williams, Vilbrandt, Huff, J. E. Meyers, Dean Gleeson and Dr. Von Fisher.

Industry was also very helpful in giving us much information, good advice and permitting inspection and reinspection of their facilities. Some of the persons with these companies are: Drs. George Whipple, E. S. Bloom, H. A. Weber, F. S. McGrew of the Polychemicals Department of duPont. Also Charlie Cooper, Ray Genereaux and others with the Engineering Experiment Station of duPont. Bill Billings, John Harvey and others of Union Carbide Chemicals were very helpful, too, in making it possible for us to visit and revisit their development laboratories. Lloyd Piester, Earl Wolfe and others at the Natrium Plant of Columbia-Southern Chemical Company

were very generous in their help and loan of blue prints. This was true also of Drs. George Hughey and John Setzer of Chemstrand Corporation: Dr. John Martin and Tom Halberstadt of the Procter & Gamble Company and Reg Ivett and his collegues at Hercules Powder Company.

Jake Meckstroth, retired Editor and Vice-President of the Ohio State Journal, was one of our best supporters in writing editorials on chemical engineering and its importance to the economy of the State of Ohio.

Drs. Mars Fontana, Chairman of the Department of Metallurgy, and the late Professor James Lord cooperated to the fullest extent in intergrating some of the facilities of Metallurgy in this building.

Professor Bill Davis and Don Bowser of our Department of Photography did much in giving us a complete photographic history of the construction of the building.

William Linch and Ted Wilson of the University Architects Office; Paul Elleman, Director of the physical Plant and his collegues, as Walter Hartman, Thomas Smith and William Bischoff also contributed much to bring the building to a successful completion. Dick Wharton, Accountant, Engineering Experiment Station, did an outstanding job in processing the many requisitions. Harry Warner, President, B. F. Goodrich Chemical Company of Cleveland; Melvin DeGroote, Vice-President of Tretolite, St. Louis, Mo.; and John Smootes, retired Vice-President of the Sohio Petroleum Company are still doing a yeoman's job in heading up our alumni fund raising campaign to get additional equipment for the building. Chester Ball, Editor at our Engineering Experiment Station, did much in the preparation of brochures, programs and other publicity items so necessary in a venture such as ours.

THE OHIO STATE UNIVERSITY
DEPARTMENT OF CHEMICAL ENGINEERING
SEPTEMBER 19, 1960

A list of photographs which might be used for a chapter in the book, "Laboratory Planning."

PLANNING THE CHEMICAL ENGINEERING BUILDING
by
JOSEPH H. KOFFOLT

PHOTOGRAPH NUMBER		
1.	B7818	The Ohio State University - Architect's Concept of the Completed Chemical Engineering and Mineral Industries Building.
2.	2	The Ohio State University - Chemical Engineering Building
3.	B27065 - 6	The Ohio State University - Chemical Engineering Building Basement Plan
4.	B27065 - 5	The Ohio State University - Chemical Engineering Building First Floor Plan
5.	B27065 - 4	The Ohio State University - Chemical Engineering Building Second Floor Plan
6.	B27065 - 3	The Ohio State University - Chemical Engineering Building Third Floor Plan
7.	B27065 - 2	The Ohio State University - Chemical Engineering Building Fourth Floor Plan
8.	B27065 - 1	The Ohio State University - Chemical Engineering Building Penthouse and Roof Plan
9.	B27300 - 8	The Ohio State University - Chemical Engineering Unit Operations Laboratory
10.	B27300 - 3	The Ohio State University - Chemical Engineering Building 4th Floor, showing Double Pass Heat Exchanger, 4-Stage Evactor and Single-Stage Chill Tank
11.	B27300 - 9	The Ohio State University - Chemical Engineering Building Process Development Laboratory
12.	B24022 - 12	The Ohio State University - Chemical Engineering Building Using Carbon 14 in the Radiotracer Laboratory
13.	B24033 - 8	The Ohio State University - Chemical Engineering Building Professor Robert S. Brodkey in the Turbulence Research Laboratory. The Equipment Shown Includes a Spectrum Analyzer, Hot Film Anemometer, and Micro Manometer.

14.	B24022 - 9	The Ohio State University - Chemical Engineering Building Professors Robert S. Brodkey and Aldrich Syverson in the Analog Computer Laboratory
15.	B24022 - 10	The Ohio State University - Chemical Engineering Building Unit Operations Laboratory - Third Floor
16.	B27300 - 10	The Ohio State University - Chemical Engineering Building Chemical Engineering Thermodynamics Laboratory Purification of Liquids for Physical Measurements.
17.	B27300 - 11	The Ohio State University - Chemical Engineering Building Physical Measurements or Chemical Engineering Thermodynamics Laboratory Measurement of Vapor Pressure
18.	B27300 - 7	The Ohio State University - Chemical Engineering Building Student Glass Blowing Laboratory
19.	B27300 - 1	The Ohio State University - Chemical Engineering Building Nuclear Laboratory. Walk-In Hood. Radio Tracer Studies on Vapor Phase Reaction Kinetic Studies.
20.	B24022 - 3	The Ohio State University - Chemical Engineering Building Professor Charles E. Dryden and Research Assistant James C. Leslie taking a Radiation Count with a Shielded, Manual, Sample changer and a Detecto-Lab Scalar in the Counter Room of the Nuclear Engineering Laboratory.
21.	B24022 - 4	The Ohio State University - Chemical Engineering Building Professor Charles E. Dryden and Research Assistant James C. Leslie Monitoring a Possible Radiation Hazard in One of the Four Hoods Available for Radiation Studies in the Nuclear Engineering Laboratory.
22.	B27300 - 5	The Ohio State University - Chemical Engineering Building Mass Transfer Laboratory Frequency Response Analysis in Mass Transfer.
23.	B27300 - 4	The Ohio State University - Chemical Engineering Building Furnace and Pyrometry Laboratory Fluidized Calcinar
24.	B27300 - 2	The Ohio State University - Chemical Engineering Department Furnace and Pyrometry Laboratory. Submerged Combustion Unit.
25.	B24017 - 5	The Ohio State University - Chemical Engineering Building General Laboratory

26.	D22419 - 1	The Ohio State University - Chemical Engineering Building Penthouse Fumehood Exhaust Fan System.
27.	B22419 - 2	The Ohio State University - Chemical Engineering Building Penthouse Fume Hood Exhaust Fan System.
28.	B27300 - 6	The Ohio State University - Chemical Engineering Building Graduate Laboratory Kinetic Sorption Apparatus

Floor plans of the chemical engineering building, Ohio State University.

Figure 13.3 Basement plan.

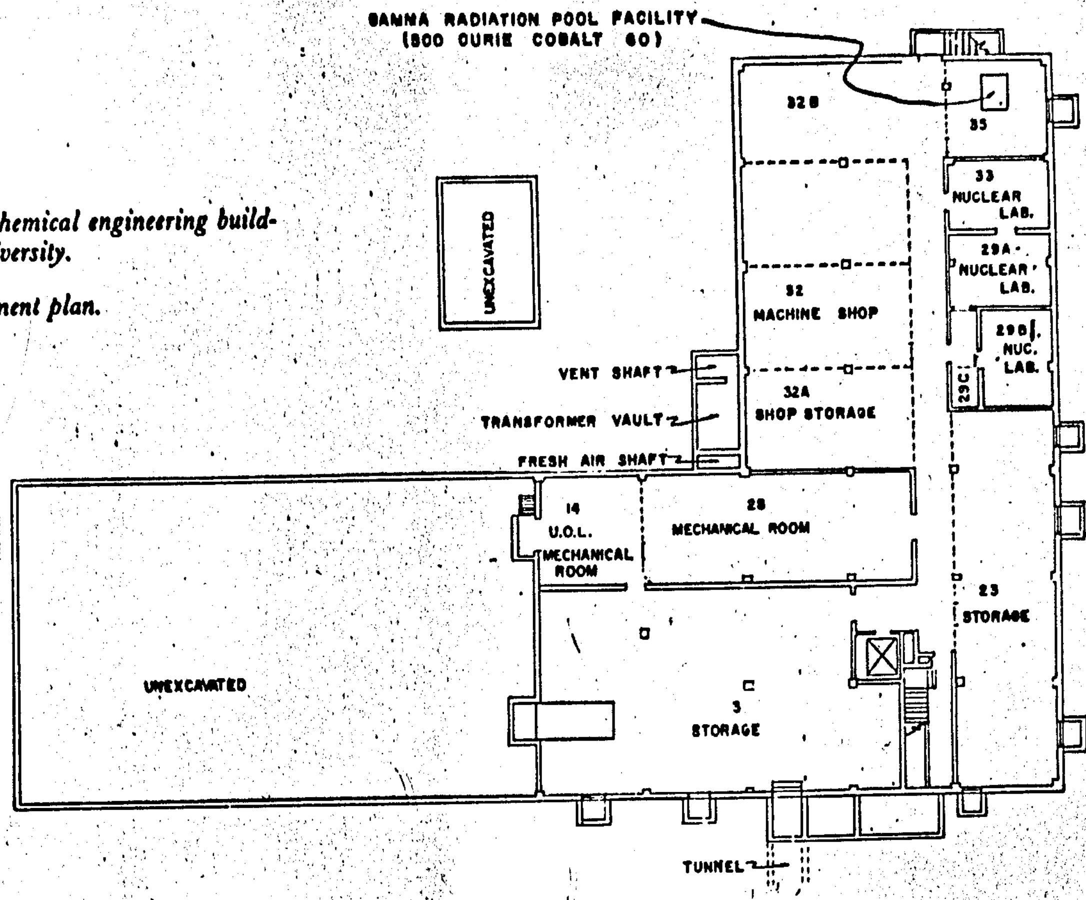
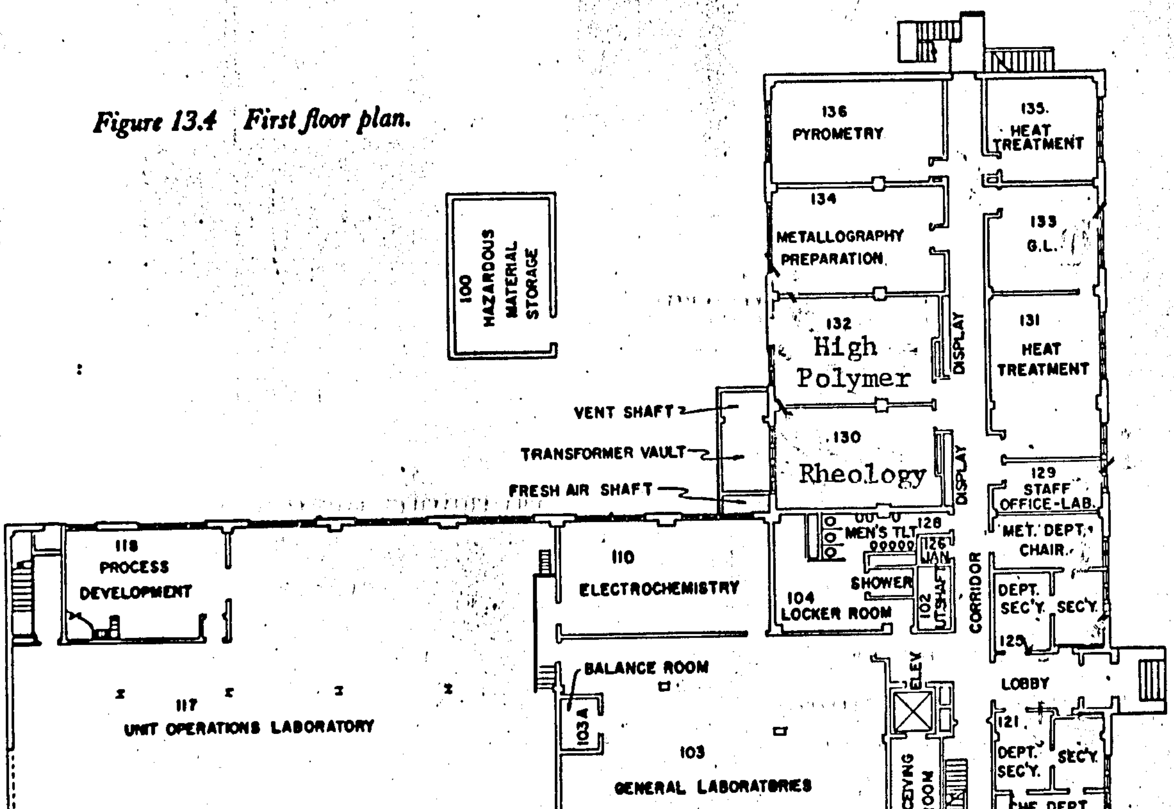


Figure 13.4 First floor plan.



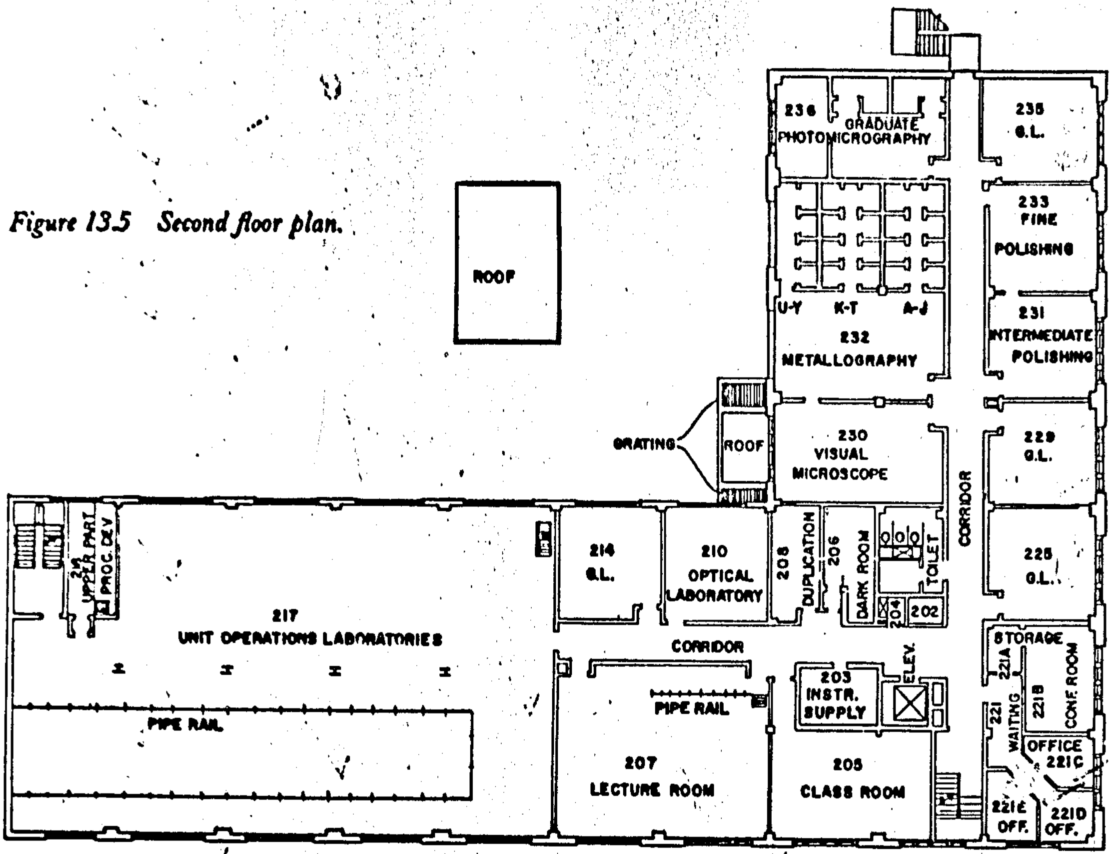


Figure 13.5 Second floor plan.

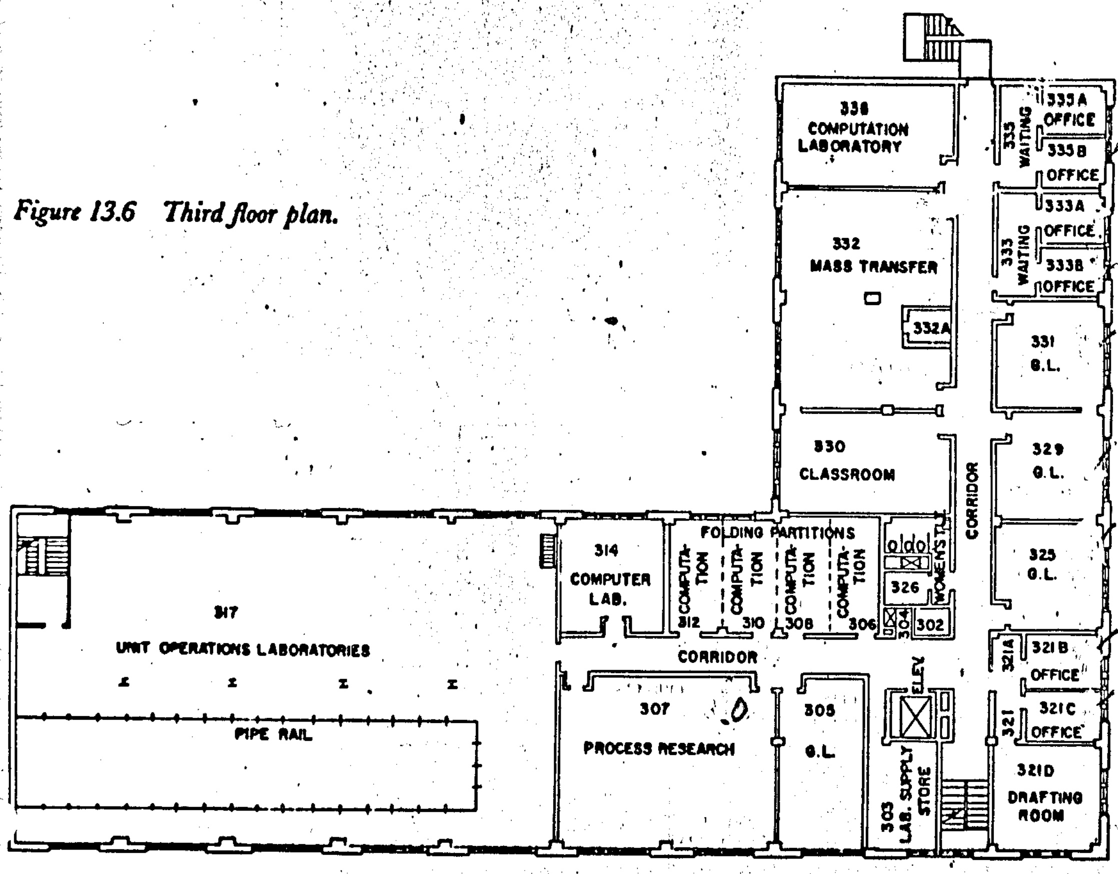


Figure 13.6 Third floor plan.

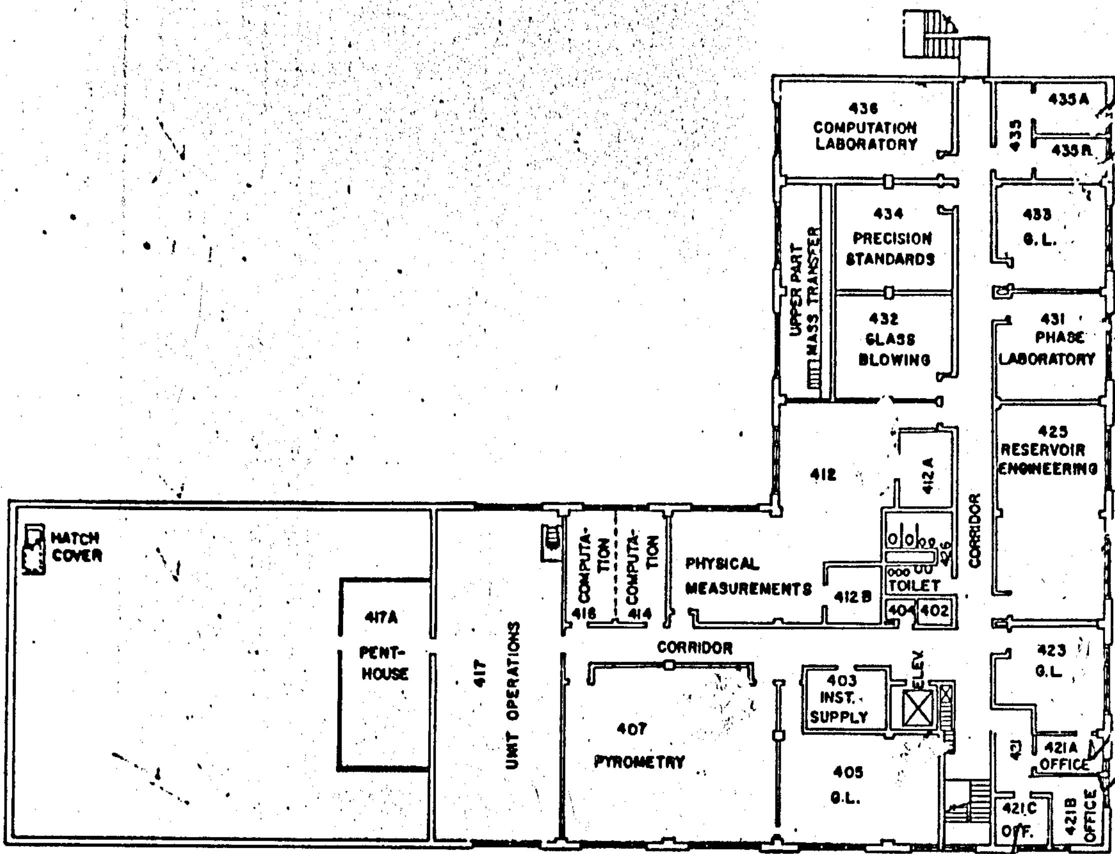


Figure 13.7 Fourth floor plan.

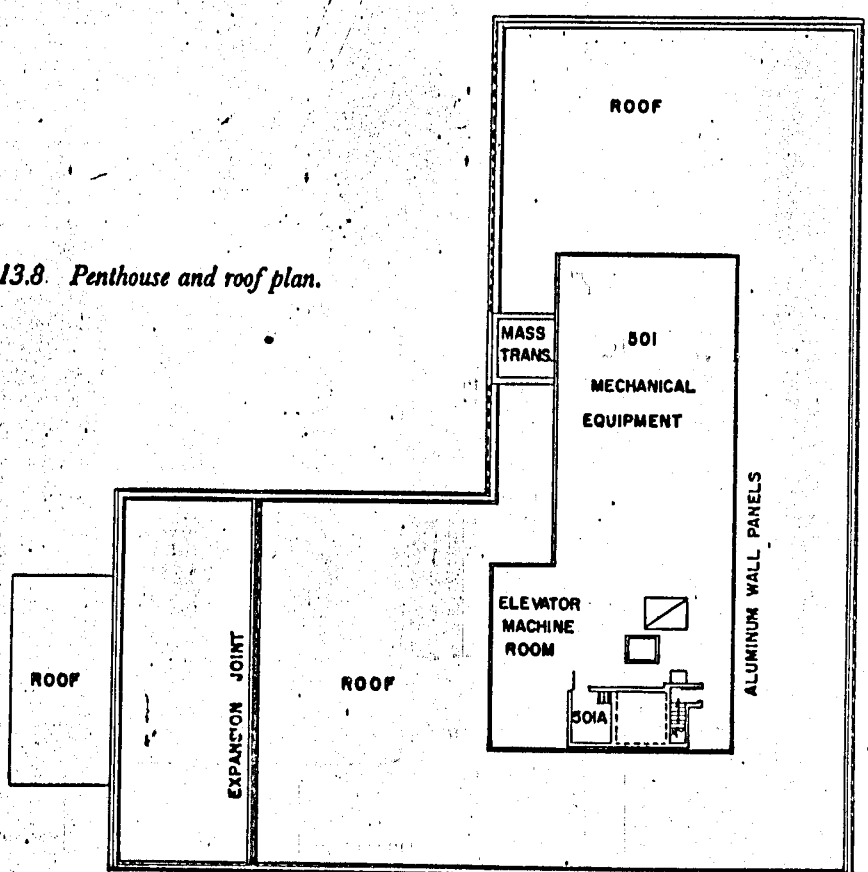


Figure 13.8 Penthouse and roof plan.

APPENDIX II

II

New Chemical Engineering Machinery Laboratory at Ohio State University

Joseph H. Koffolt and James R. Withrow

Reprinted from News Edition
Industrial and Engineering Chemistry
Vol. 13, Page 401, October 20, 1935

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INDUSTRIAL AND ENGINEERING CHEMISTRY
Vol. 13, Page 401, October 20, 1935

New Chemical Engineering Machinery Laboratory at Ohio State University

JOSEPH H. KOFFOLT AND JAMES R. WITHROW
Ohio State University, Columbus, Ohio

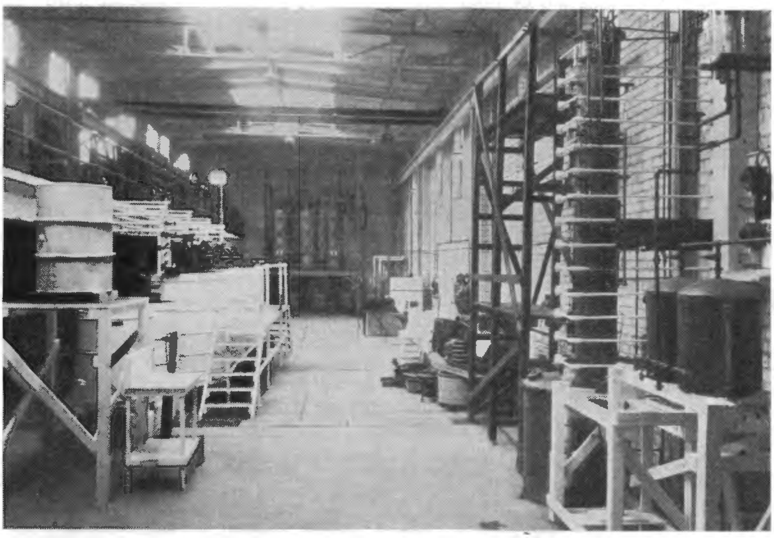


FIGURE 1. MACHINERY LABORATORY. ARRANGEMENT EQUIPMENT, 2-STORY SECTION

THE new chemical engineering laboratories at Ohio State University are located in the southeast corner of the new Chemistry and Chemical Engineering Building, which constitutes the east side of the engineering quadrangle. The chemical engineering laboratories contain approximately 18,000 square feet of floor space, and are divided into the following divisions: Machinery Laboratory, Furnace Laboratory, Acid Laboratory, Industrial Chemistry Laboratory, and 21 smaller research laboratories which are occupied by staff members and graduate students.

This paper gives a brief description of the new machinery laboratory, equipment contained therein, and use made thereof. This laboratory is 125 feet long and 48 feet wide, of saw-tooth and 2-story steel-framed construction with longitudinal balcony running the whole length of the laboratory. It contains a 2-ton crane which facilitates the setting up and moving of equipment for special work. It is fully equipped with all necessary service lines as water, high- and low-pressure steam and air, and 110-, 220-, and 440-volt electrical lines. The architect of the original building, which was constructed in sections at three different times, followed the chemistry plan of servicing the laboratory from service trenches. This was entirely abandoned in the chemical engineering portion, these trenches being used as additional drains. It will be noted in Figure 1 that the service lines are carried at the back of the longitudinal balcony under the saw-tooth section.

The laboratory contains practically all machinery necessary for teaching and research on the chemical engineering operations, with the exception of furnacing and absorption equipment which are contained in other laboratories. All machinery in the laboratories was set up and some built by the students themselves, as part of their regular laboratory work.

The Longitudinal Balcony

The longitudinal balcony runs down through the center of the laboratory, but really serves as a side balcony for saw-tooth and 2-story sections. The floor is made up of removable slab sections. It serves the obvious purpose of head tanks for precipitation, continuous distillation, pilot plant work, calibration of fluid flow instruments, centrifugal pump testing, instrument gallery, and miscellaneous altitude experimental work.

Precipitation and Reaction Tanks

The precipitation and reaction tanks consist of four 750-gallon and four 250-gallon wood tanks, all equipped with agitators and serviced with steam and water. The piping is so arranged that tanks can be connected to any of the three electrically driven centrifugal pumps. Solutions contained in them can be pumped from any one tank to any other, and to equipment located in the room, such as the triple effect evaporator, Kelly and Shriver filter presses, and fluid flow set up. They are also used in connection with the "main factory process development" problem, in which the students make 100 pounds of precipitated material, such as aluminum hydrate, as one portion (so-called pilot plant) of a major project where the objective is the laying of a proper chemical engineering and economic basis for a later project in chemical plant design.

Distillation Equipment

The distillation equipment in the machinery laboratory is copper. It consists of a 25-gallon steam-jacketed still, Figure 2, and a 100-gallon fractional distillation unit. The steam-jacketed still may be operated either as a simple still, packed column, or a dephlegmating still. It was used for many years for making all absolute alcohol used by the university. The fractional distillation unit is much more flexible in operation, and is so arranged that it may be operated, for instance, in any one of the following ways: simple batch still; simple continuous still; batch column still; continuous column still; stripping still; steam still; simple and compound dephlegmating still; multi-component distillation; bubble cap absorption tower; any of the foregoing continuous or batch operations may be carried out under atmospheric pressure or any desired vacuum.

The fractional distillation unit set-up was built according to our specifications by the Ansonia Copper Co., and is made of copper with brass and bronze fittings. The

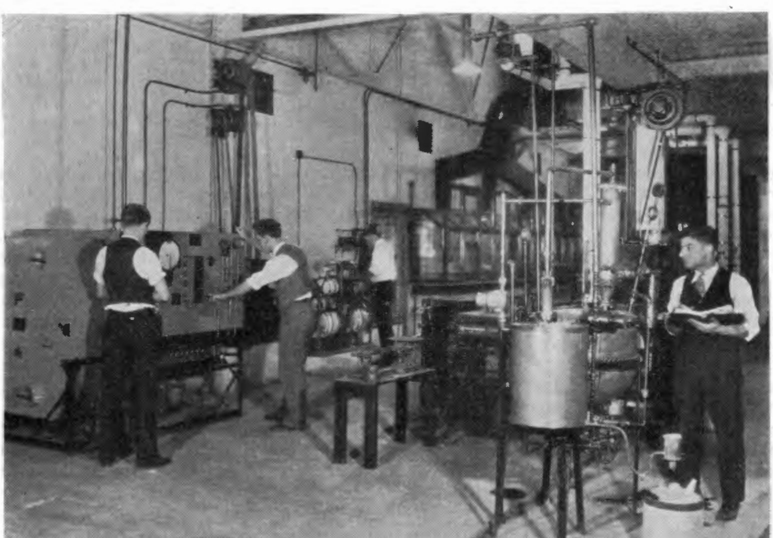


FIGURE 2. STEAM-JACKETED STILL. CARRIER DRIER, WITH HUMIDIFYING AND DEHUMIDIFYING ARRANGEMENTS

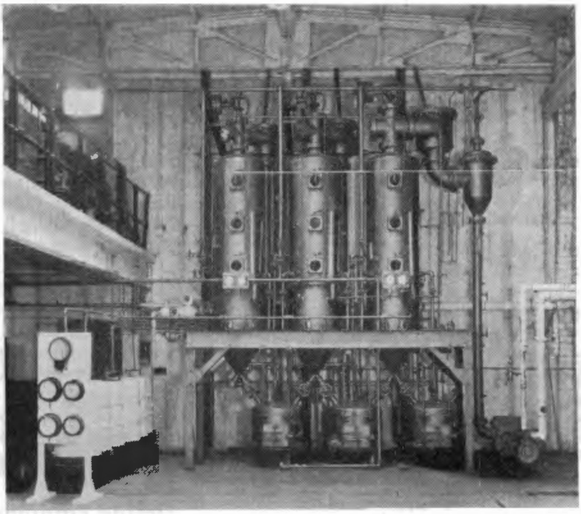


FIGURE 3. TRIPLE-EFFECT EVAPORATOR ASSEMBLY

over-all length is 13 feet and the over-all height, 20 feet. The kettle has a capacity of 100 gallons, and contains a 30-foot 1.25-inch, outside diameter, copper steam coil. The column is 14 inches in diameter and 14 feet 3 inches high. It contains 14 plates, with 4 bubble caps per plate.

The unit is fully equipped with all instruments for making necessary measurements. There is a 24-bulb balanced Wheatstone bridge indicating resistance thermometer. The temperature from any point in the still is taken at one station. Total readings can be made in a period of about 5 minutes. Rotameters are used for measuring the amount of reflux to the still and also for distillate. Sharp edge orifices for measuring the rate of feed are used when it is operated as a continuous still.

An auxiliary condenser is attached to the still when used for fractionation of cracked gasoline. The cooling medium consists of a mixture of dry ice and carbon tetrachloride in the lower (auxiliary) condenser, for capturing highly volatile fractions from the tail gases and feeding to carboys beside the scales.

Triple Effect Evaporator

The triple effect evaporator is a Struthers-Wells type vertical tube salting-out evaporator of steel-plate construction built to our specifications. It has an over-all height of approximately 21 feet and is 16 feet in length. The body of each effect is constructed of 0.3125-inch steel plate. The steam belt is 30 inches in diameter and consists of seventy-two 2-inch, outside diameter, No. 13, B. W. G. steel tubes, 30 inches long, with downtake of about 10 inches, giving a total heating surface of 87 square feet per effect. Each effect is equipped with propeller type agitator arranged to permit variations of speed of circulation through the tubes. At the bottom of each effect are located steel-plate salt filters, 30 inches in diameter by 20 inches high. The condenser is of the jet type connected to a steam-driven wet vacuum pump.

The condensate from the belts of the three effects discharges into receivers, which permits the measurement of steam consumption and the amount evaporated in each effect. The evaporator is equipped with liquor samplers, indicating and recording pressure gages, industrial immersion thermometers, and sharp-edge orifice for measuring the amount of cooling water to condenser.

The evaporator is so constructed that it can be operated as parallel current feed, countercurrent feed, and parallel series feed. With simple changes in fittings it can be converted into either a single- or double-effect evaporator.

Complete triple-effect evaporator assembly with condensate receivers and recording pressure gages are shown in Figure 3.

Crushing and Grinding Equipment

Crushing and grinding equipment includes a power-driven large size, D. F. C., jaw crusher which will reduce rock of 2 to 3 inches in diameter so that it will pass through a 10-mesh or finer sieve; a Braun disk pulverizer which will grind material from 4 to 100 mesh; a Paulo combination Abbé ball mill, which is used for both wet and dry grinding; a single type B Abbé jar ball mill mounted on a truck, which can be moved from one laboratory to another; a Tyler Ro-tap testing sieve shaker equipped with a wide assortment of screens ranging from 4 to 300 mesh.

Solids Separation Equipment

Machinery for separation of solids from solids includes in addition to Ro-tap screens a Federal air-classifying unit which will fractionate fine powders beyond 325 mesh; a D. F. C. flotation machine equipped with reversible speed motor, consisting of a single aluminum casting and a spitzkasten from which the froth collects. There is also a batch hydraulic classifier.

Knock-Testing Machine

The knock-testing machine is a series 30-B Ethyl engine with all its accessories for testing both automobile and airplane fuels under a wide range of temperature and pressure and the determination of octane rating of volatile fuels. The intensity of detonation in the engine cylinder is measured by means of a millivoltmeter or an electrolytic cell mounted on the panel board.

Filtration Equipment

Equipment for filtration, Figure 4, consists of an 18-inch square Shriver wooden chamber filter press made up of 18 chambers and frames of yellow pine, with a total filtering area of about 75 square feet. Slurry is pumped to the press from one of the 750-gallon precipitating tanks by a 2-inch centrifugal pump. This press is used primarily on the "factory research problem" where the students make over 100 pounds of dry precipitated material. There is also a Kelly filter press of all-steel construction, with 5 filter leaves, giving a total filtering surface of over 50 square feet. It is used mainly for filtering suspended and precipitated materials in treated brine solutions, which are then pumped to and evaporated in the triple effect evaporator. The small side feed, center feed, and Sweetland filter presses are mounted on trucks and can be moved to any part of the laboratory. Slurry is fed to these presses by either hand pump, montejus, or small centrifugal pump also mounted on a truck.

Drying Equipment

Machinery for studying the chemical engineering operation of drying consists of a Carrier ejector processing cabinet, equipped with both humidifying and dehumidifying arrangements. Air circulation is accomplished by means of the Carrier ejector system, whereby a secondary circulation is set up within the cabinet, of about four times the volume delivered by the fan. The air is heated by passage through eighteen individually connected 220-watt heating units. Temperature and

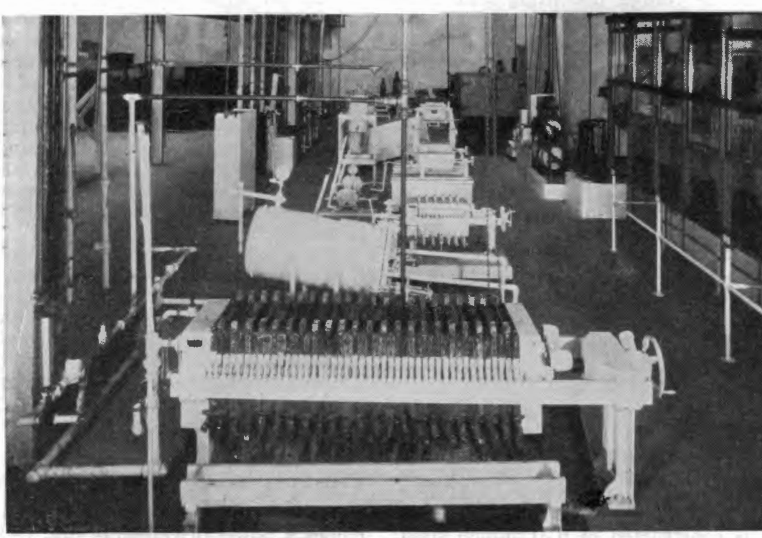


FIGURE 4. FILTRATION EQUIPMENT

humidity are controlled automatically by a thermostat, and an adjustable hygrostat. A 6-tray shelf drier and a 3-shelf vacuum drier are also used.

Tools and Shop Facilities

The tool cage functions as a tool and work shop; it services all other laboratories, and is in charge of a member of the staff who keeps track of all tools and assists in supervision of shop construction of equipment by both graduate and undergraduate students. Arrangements are also made by him for use by our students in maintenance and construction of equipment for other shop facilities located in the various departments on the campus, such as welding and brazing; power tools, such as lathes, drill presses, milling machines, shapers, pipe threaders, etc.

Research Stores

Research stores are considered very important portions of equipment, and consist of residues of equipment left from previous and completed researches, especially materials that have been accumulated from industry and were the basis of particular investigations and publication. These materials are frequently irreplaceable and great care is taken to conserve them, especially to protect labels from damage by fumes. They are stored in a standard, flexible metal shelf storage cage. In former years when these stores were subject to chemical fumes maintenance of labeling was difficult or impossible. The matter was easily controlled, however, by storage of material in related groups, easily identified by those responsible for the laboratory. The essential absence of fumes from the machinery laboratory makes this problem very simple. We are no longer confronted with the losses caused by unreasoning application of easily understandable blanket orders from executives not familiar with industrial research that all such stores be destroyed when labels become illegible. This left no opportunity for recharacterizing material by those familiar with it, and resulted at times in the loss of hundreds of dollars worth of materials, though such arbitrary ruling by authorities enabled us to wipe the slate clean and start over. No such arbitrariness is tolerated in chemical engineering, but insistence is placed upon the maintenance of proper records. Of course no inflammable or fume materials are preserved except in isolated storage.

The machinery laboratory represents the results of 29 years' development in teaching laboratory work in the chemical engineering operations at this university. The work was first started in the basement of the old Chemistry Building with very meager equipment and facilities. The basic idea has been held from the beginning to give essential laboratory training for the student's professional career as an engineer and citizen. The work is so organized as to lead to these two objectives.

Already we approach the crowded conditions of our other laboratories because of both graduate and undergraduate expansion in the number of students. This year, before the fall quarter opens, every research laboratory for graduate students is fully booked before the new graduate students arrive. Crowding is particularly undesirable in the machinery laboratory in the study of the chemical engineering operations. Nevertheless we have found our layout in the short period of its operation to be a very effective teaching tool, and a tremendous improvement in effectiveness over the exceptionally crowded and straightened conditions of the earlier years of development.

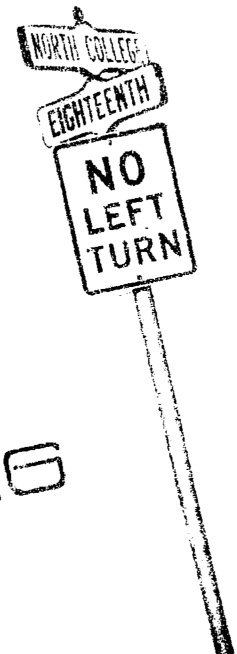
Only half of the desired space was available when the laboratory was planned. Already we are distressed that the erection of one or more additional pieces of equipment to illustrate fundamental chemical engineering operations will give the laboratory a crowded appearance. This we believe hazardous and is bad teaching for engineers. We suggest that anyone starting such a laboratory reserve more space than was permitted to us. Our laboratory was designed with the expectation of doubling its size as our student numbers grew. When it was designed, as members of the Chemical Department, our desires for a 3-story steel skeleton structure were vetoed. We expect on expansion, however, to have three stories or more.

PRINTED IN U. S. A.

APPENDIX III

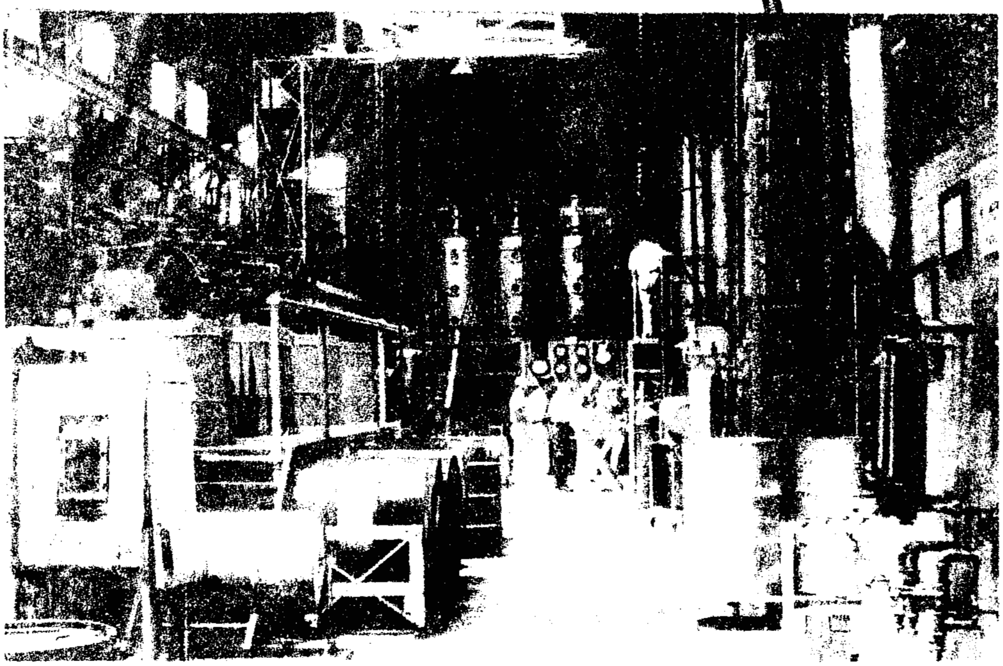
III

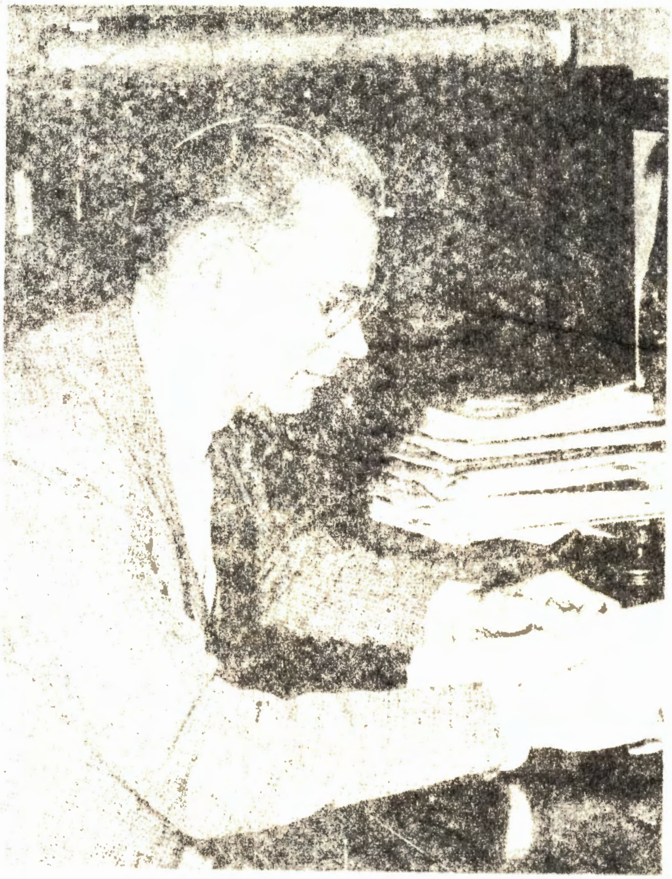
DEPARTMENT OF CHEMICAL



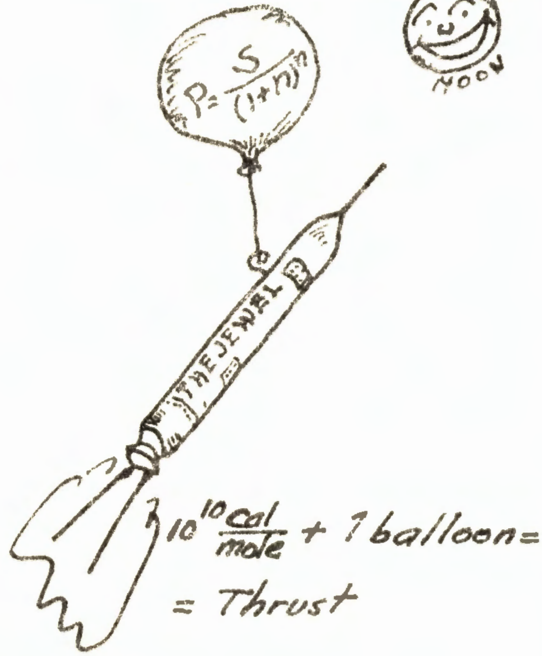
ENGINEERING

1991





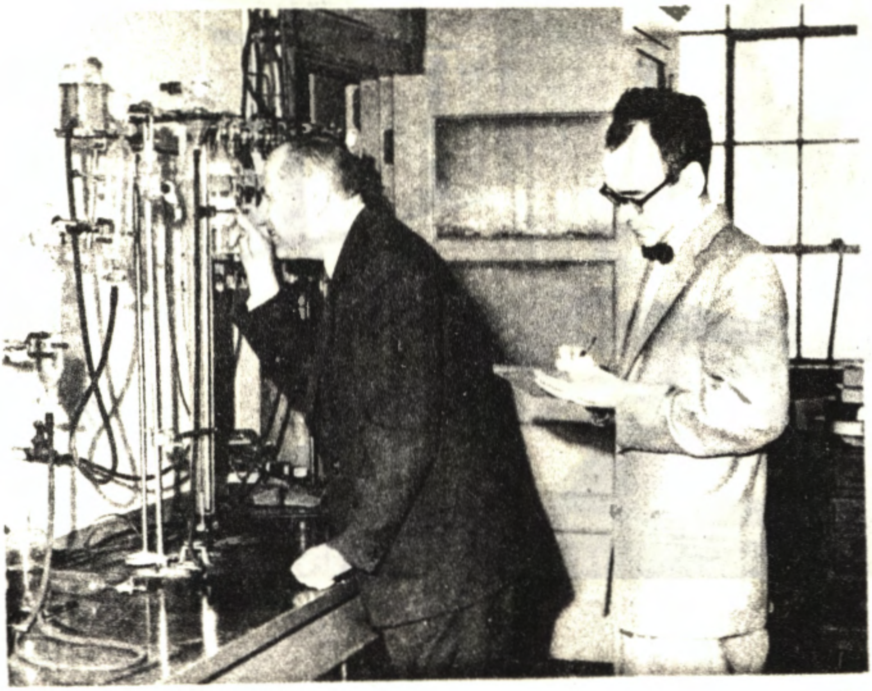
PROFESSOR ALDRICH SYVERSON

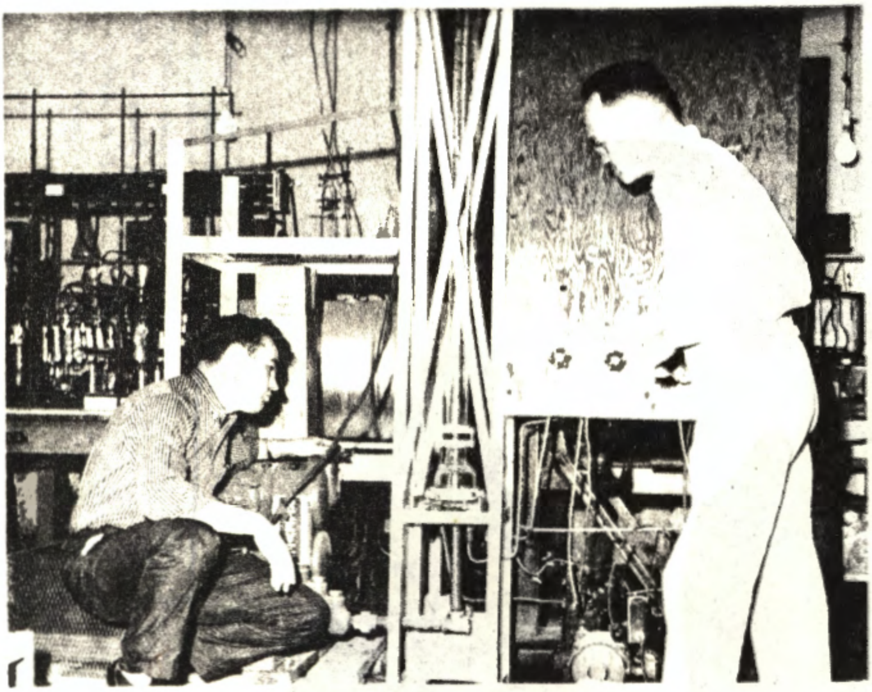


PROFESSOR WEBSTER B. KAY

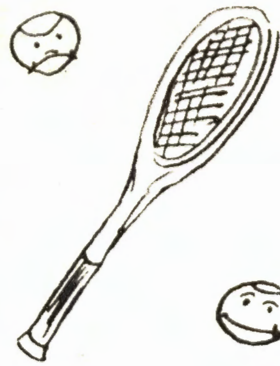
THE ENGINEERING EXPERIMENT STATION

DRS. E.E. SMITH AND F.O. KRUMINN WITH THE ORSAT GAS ANALYZER.

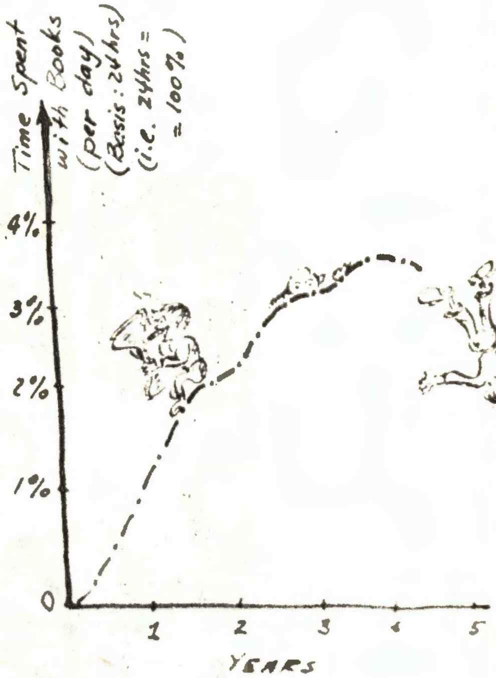




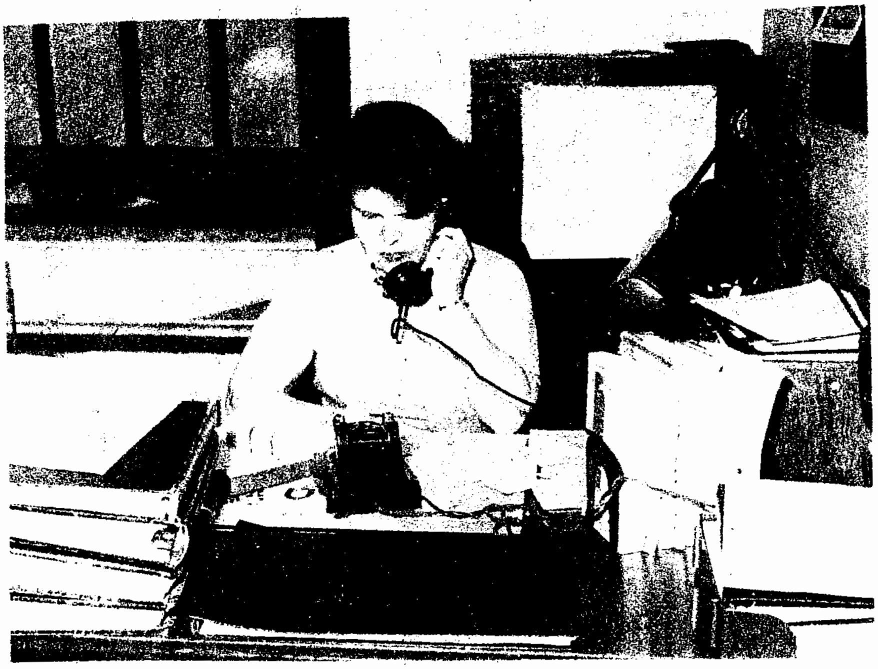
CHARLIE DRUM AND HAROLD TSE



PROFESSOR CHRISTIE GEANKOPLIS



MR. CLYDE H. KEARNS



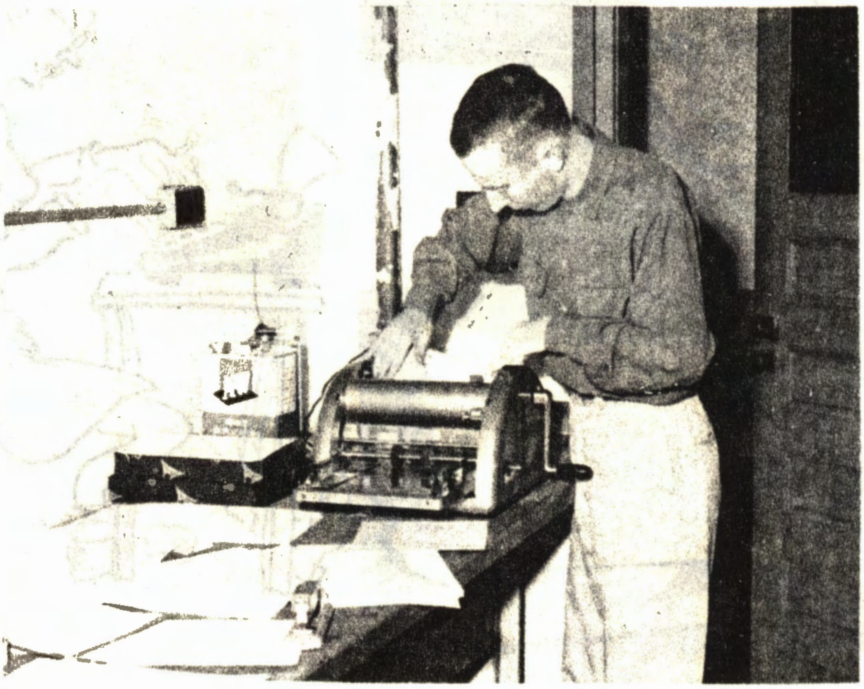
CLARA HATZER

Les Girls

CAROLYN BENNETT

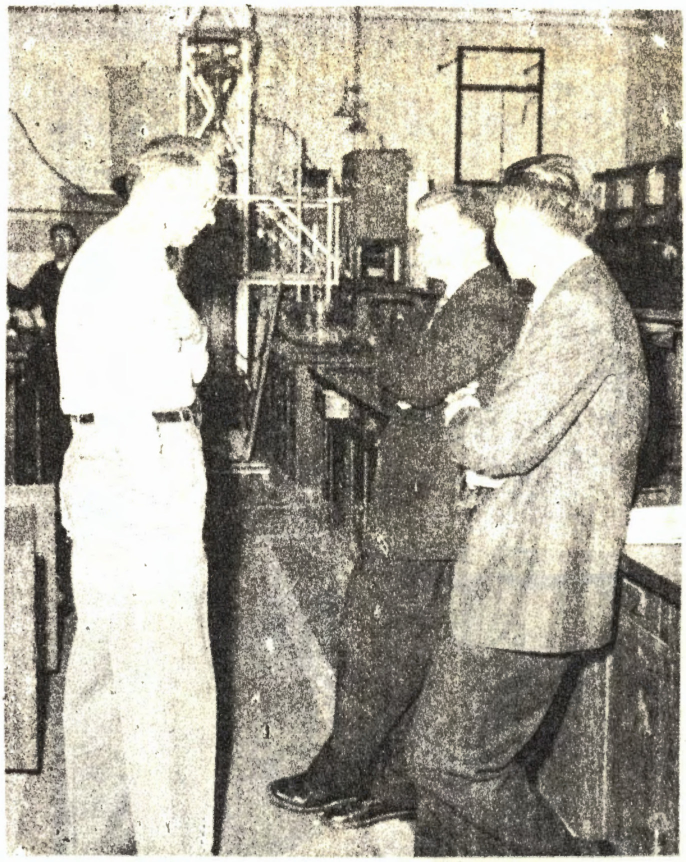
MARJEAN TRAU

DICK SHAEFER WOULD NOT LET US TAKE A PEEK AT THE TEST HE IS MIMEOGRAPHING !



JOE IS EXPLAINING THE WONDERS OF CHEMICAL ENGINEERING
TO HIS "JEWELS." LET'S SEE NOW:

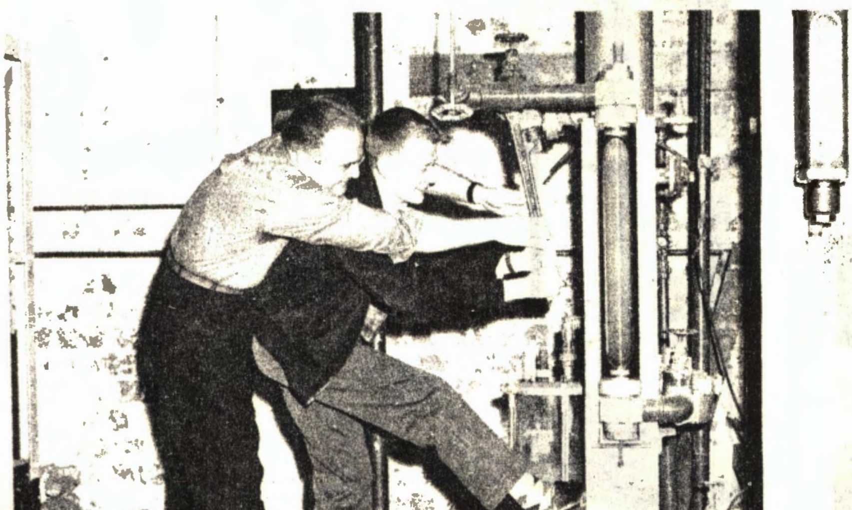
WONDER No. 1: CIGAR IN THE MOUTH, RIGHT?



DR. SYVERSON ADVISING

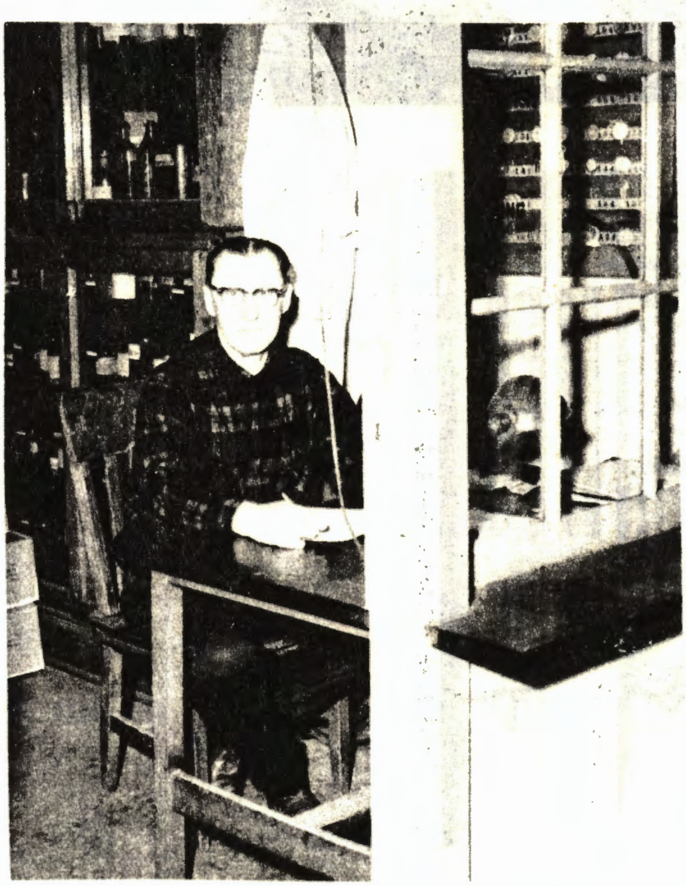
"THIS HERE ALUMINUM HIDRATE,
LIGHT SHORE AIN'T THE BEST
THAT EVER CAME OUT OF THESE
HERE LABORAT'RIES" *
*SO SAIZ CHARLIE, AND LEE
ADDIE, JIM ALBERY AND ORA
REEDY ARE VERY SADDENED!

THE MAN CALLED KELLY,
WHO FIXES UP EVERYTHING.



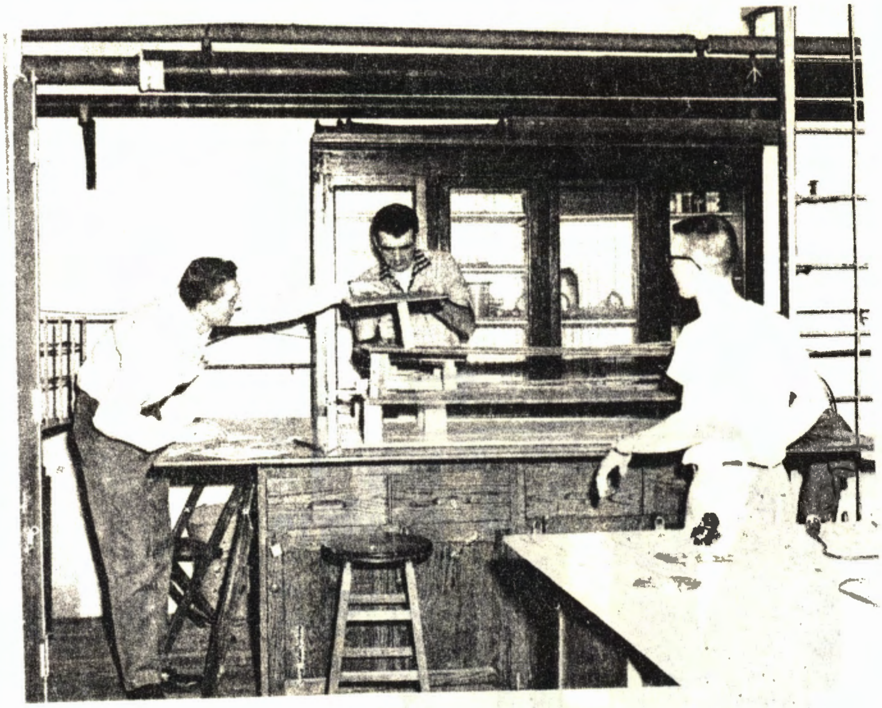
THE MEN WHO KEEP KELLY
BUSY.
(NAMES ARE NOT IMPORTANT
HERE!)

SALE! SALE! SALE!
ANYTHING FROM USED
RUBBER STOPPERS TO
LEAKY RUBBER HOSE
REALLY CHEAP! DON'T
MISS THIS OPPORTUNITY!



HERMAN, THE KEEPER
OF THE KEYS.

WINNERS OF THE NATIONAL
STUDENT CONTEST AWARDS:
GERALD A. WILCOX (on the left)
ORA LEE REEDY (on the right)
GEORGE SACHSEL (middle, presented
awards)



SENIOR PROJECT:
RON DAVIS, BOB HEASTON
AND JIM ALBERY ARE
BUILDING LITTLE
WOODEN TANKS.
OOPS! IT'S GONNA
TOPPLE, FELLOWS!

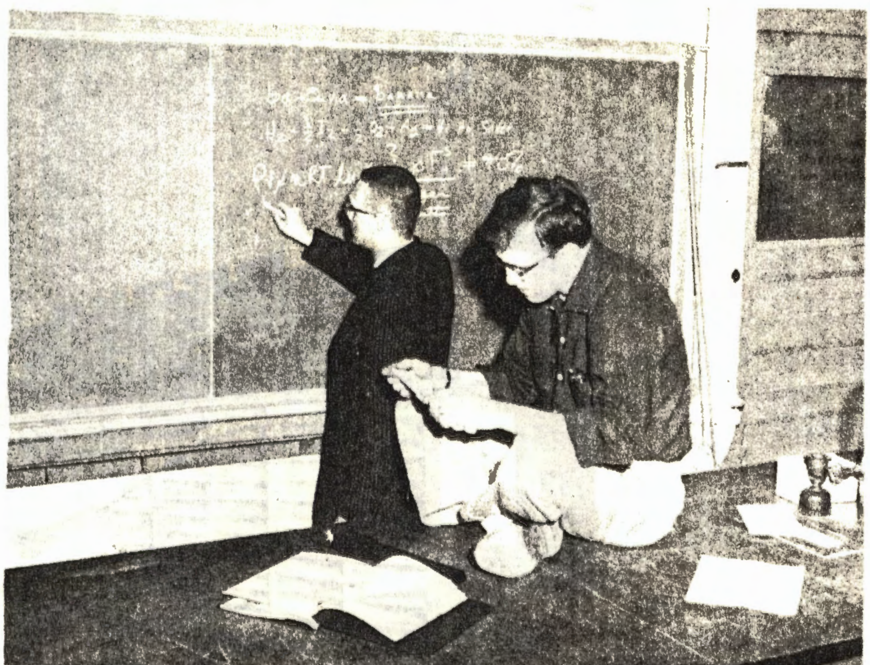
1 A.M. - STILL AT IT ARE:
MASTER BATES AND JIM ALBERLY
(OR ALBERRY? NO, WRONG GUESS,
FOR JIM WANTS IT SPELLED LIKE
ALBERY, O.K.?)

"KORK" THOMPSON, BRYAN (NOOK) NYQUIST AND DALE DENNY ARE BUSILY WORKING ON A CROSS-WORD PUZZLE

WHILE

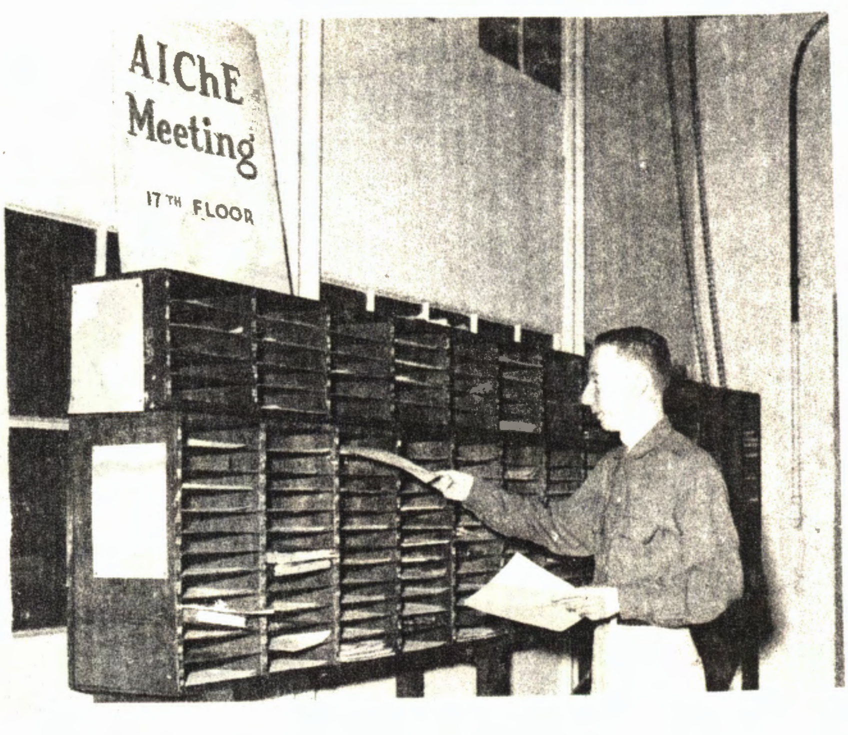
BILL GLOMB AND JOHN H. KUHN ARE TRYING OUT THE "W A G" METHOD.

JOHN CHANGED HIS MIDDLE INITIAL IN HONOUR OF OUR GREAT LEADER, "J.H.K."



I N T E R V I E W I N G

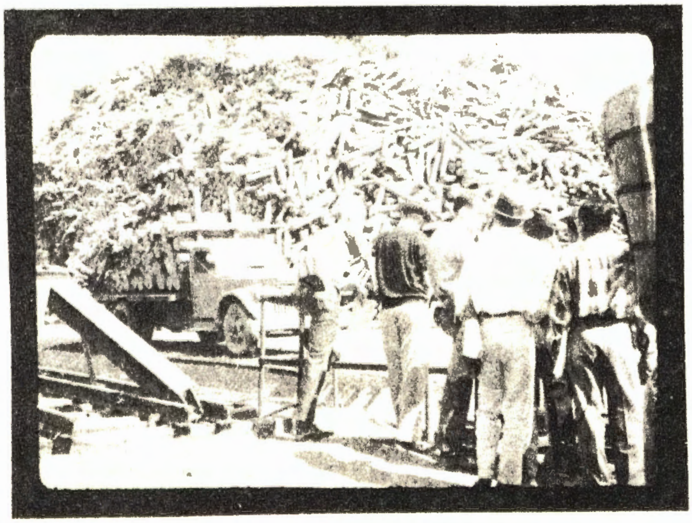
JOHN H. KUHN AND RONALD E. (EUGENE) DAVIS, ALSO KNOWN THE "RIPPER", ARE SIGNING UP FOR INTERVIEWS.



DICK SCHAEFER PUTS THE INTERVIEW NOTICES INTO OUR MAILBOXES.

INSPECTION TRIP TO THE MEADE CO.
Secret Agent Mel Hoover (with cigar in the mouth) peeking to find out about the classified travel route.

LOTS OF TOOTHPICKS, RIGHT
CHARLIE?



MR. MADDOX FROM THE GULF-GOODRICH COMPANY IS VERY IMPRESSED BY ORA LEE REEDY'S QUALIFICATIONS (FOR HE,ORA, IS A JEWEL!)

AS TO THE POSSIBLE OUTCOMES, SEE BELOW:

Our personnel requirements have been completely reviewed since our discussion, and I regret that we will be unable to offer you a position in keeping with your desires and qualifications.

DING!

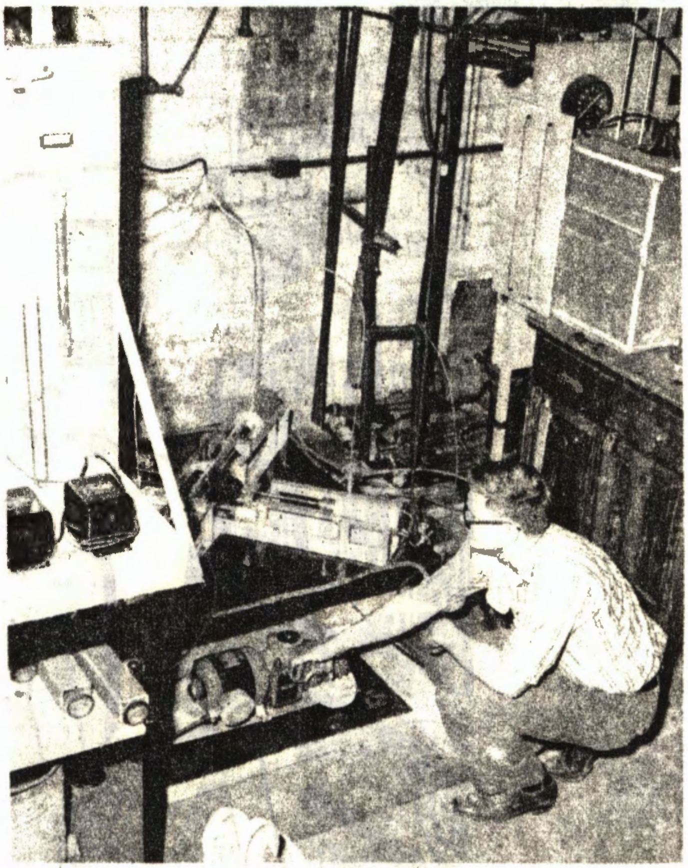
OR

Dear Mr. Reedy:

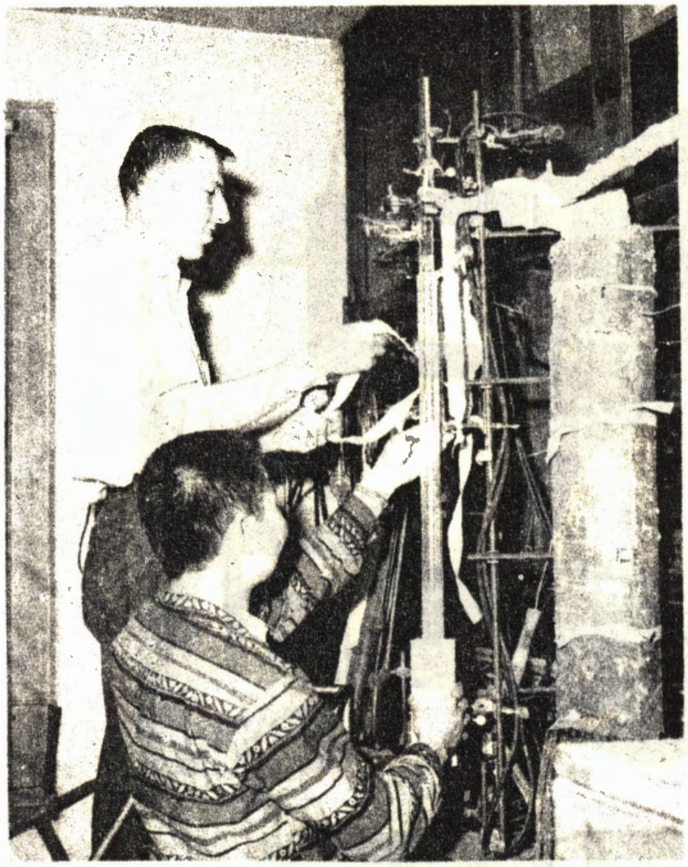
I am pleased to tell you that you made a fine impression upon all of the men with whom you talked here at Chillicothe. We are certain that your academic and industrial background will be a definite asset to The Mead Corporation and I am happy to invite you to join us upon the completion of your college work in July, 1959.

GRADUATE STUDENTS AT WORK

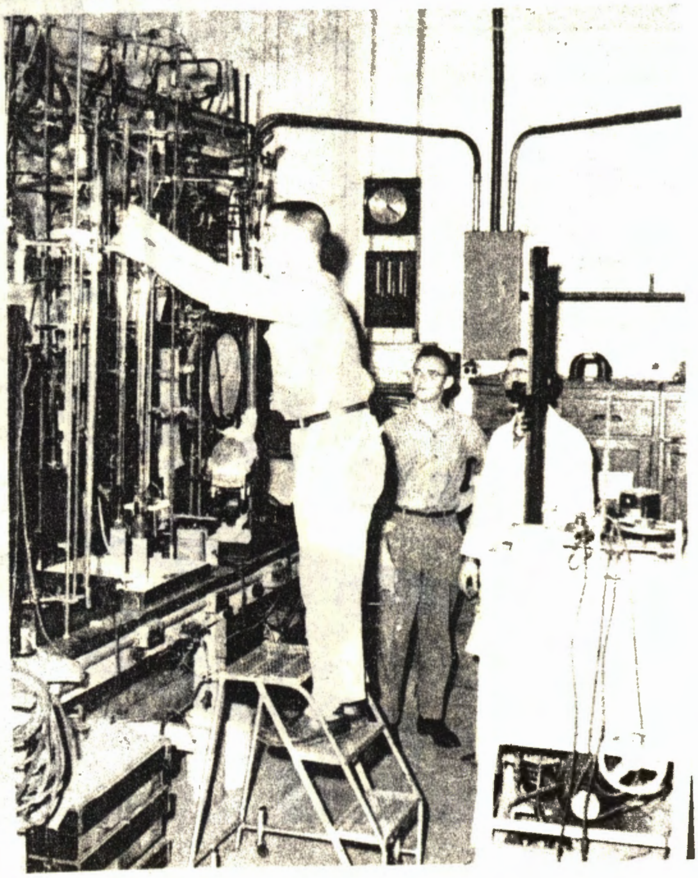
DAVID P. MACARUS



ART LILES

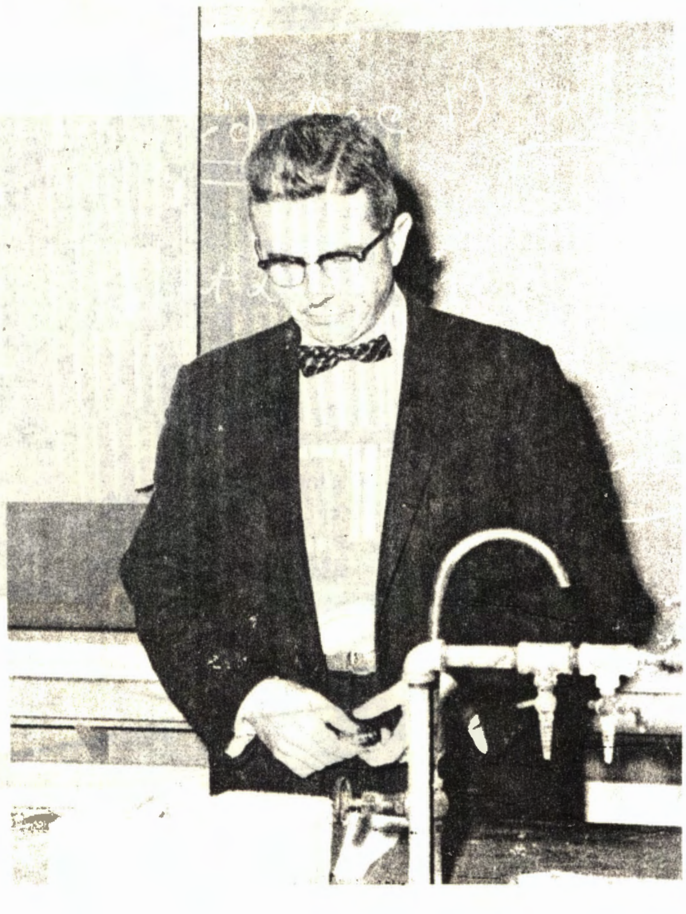


PHIL GIFFORD AND JOHN LEE
ARE GIVING FIRST AID TO THE
ADSORBTION COLUMN.



FRED LEVERETT, LLOYD JONES
AND LARRY JORDAN
DON'T LET THAT FREE ENERGY
SNEAK OUT, FRED!

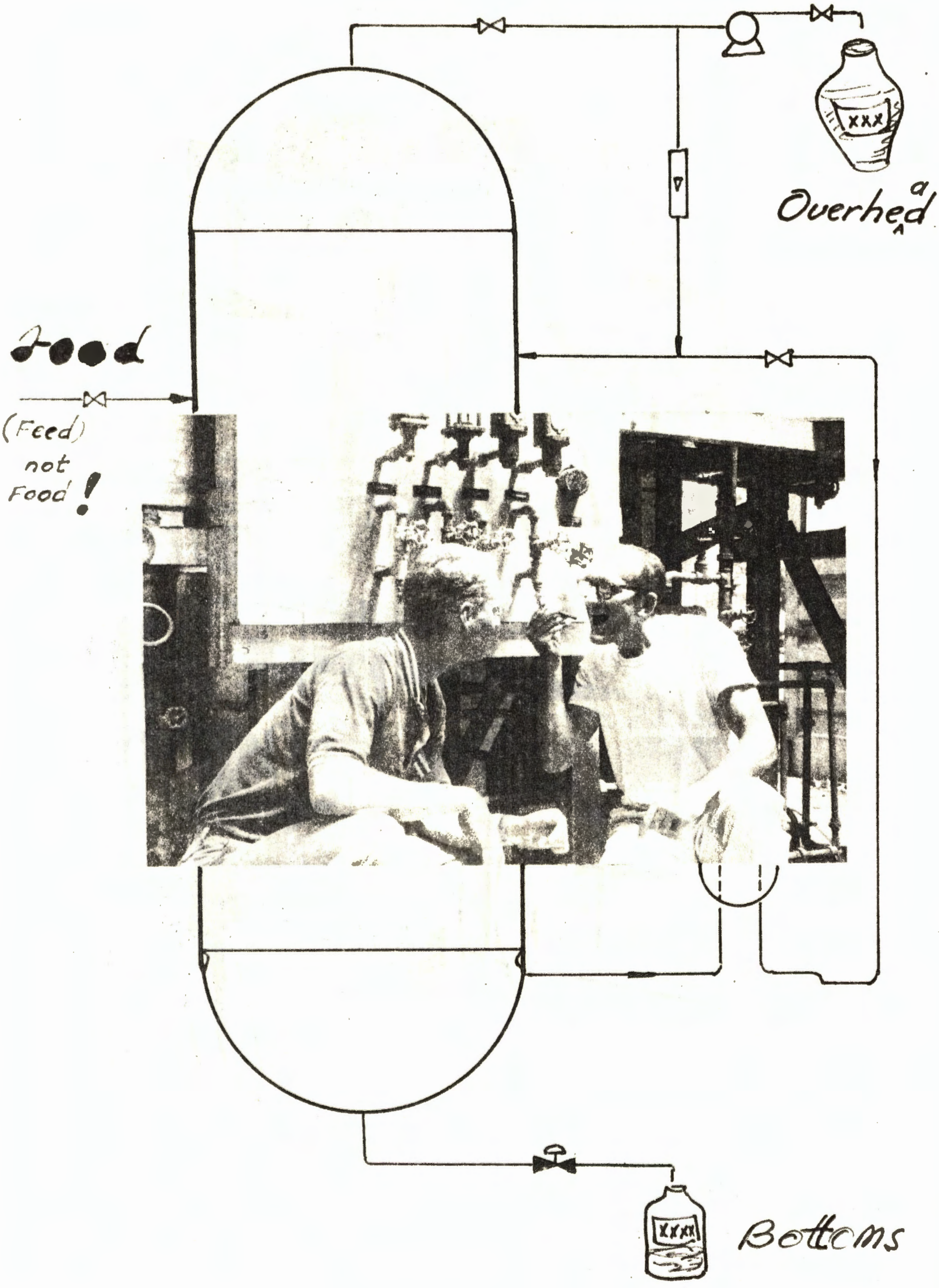
A.I.Ch.E. MEETING
PASS THE PLAYBOY
AROUND, PAL.



THE FAUCETS <u>ARE</u> <u>NOT</u>
LEAKING, FOR A CHANGE,
WHILE MR. ROBERT H.
BALDWIN, DUPONT'S ABLE
SCIENTIST, LECTURES.

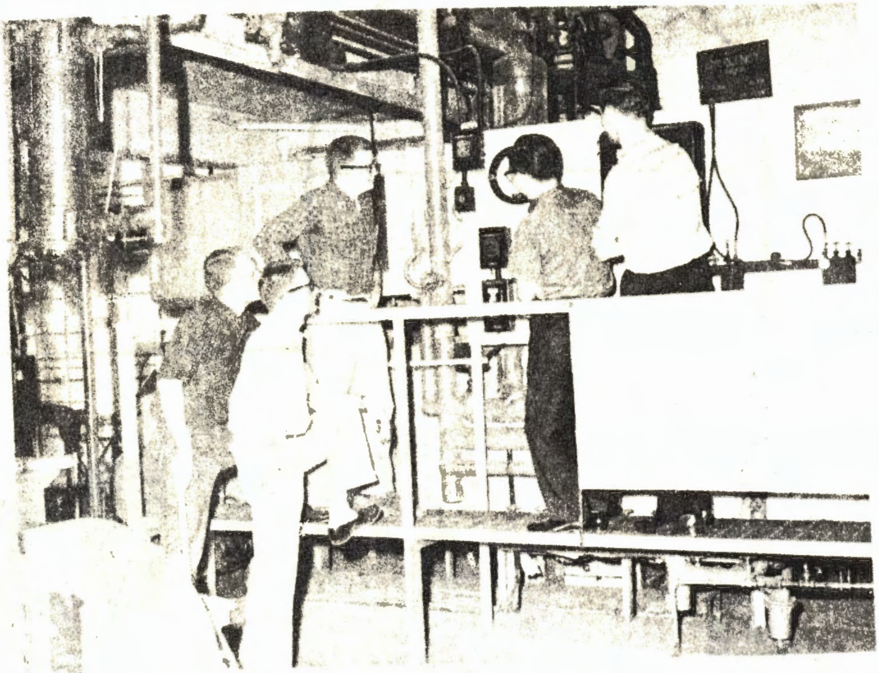
"THAT PEANUT-BUTTER SANDWICH IS TASTY, ISN'T IT, JIM?" "YOU GOT LEBERWURST ON YOURS, DON?"

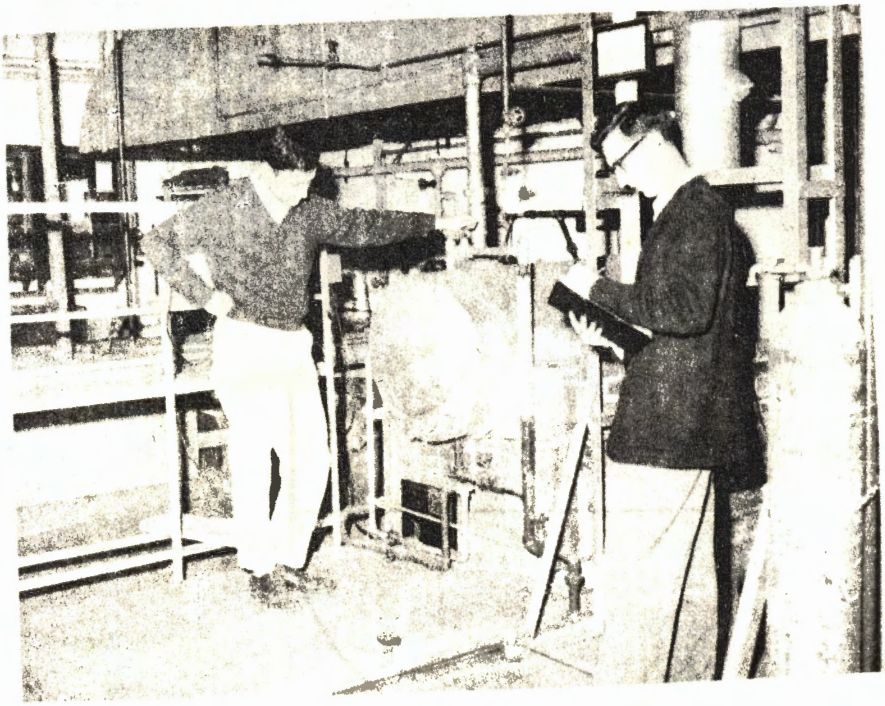
DEAN (DEANO) FISHER WON'T STOP FOR LUNCH! HE IS A REGULAR BOOK-WORM, ISN'T HE NOW?



Food
(Feed)
not
Food!
XXX
Overhead
XXXX
Bottoms

UNIT OPERATIONS LABORATORY

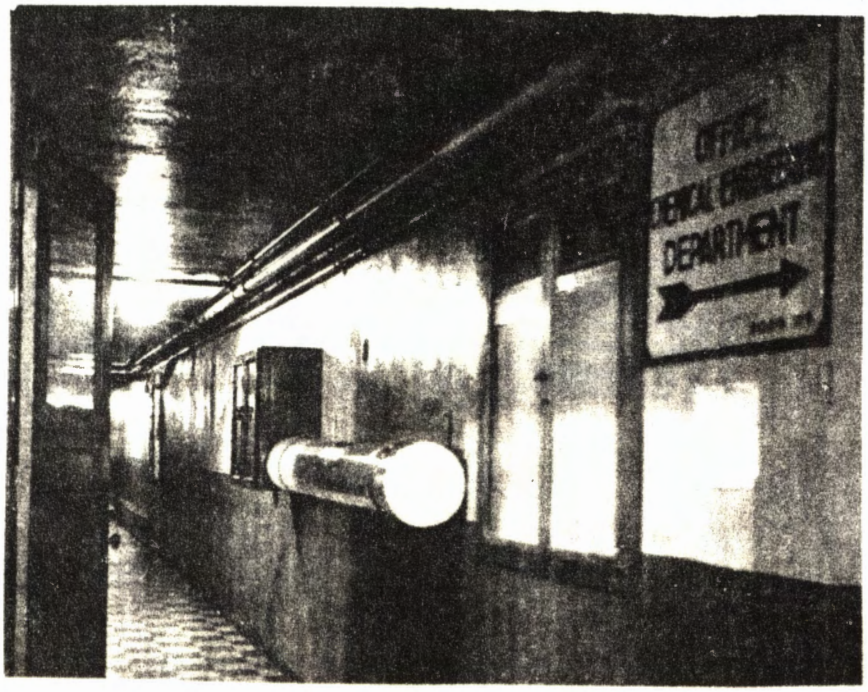




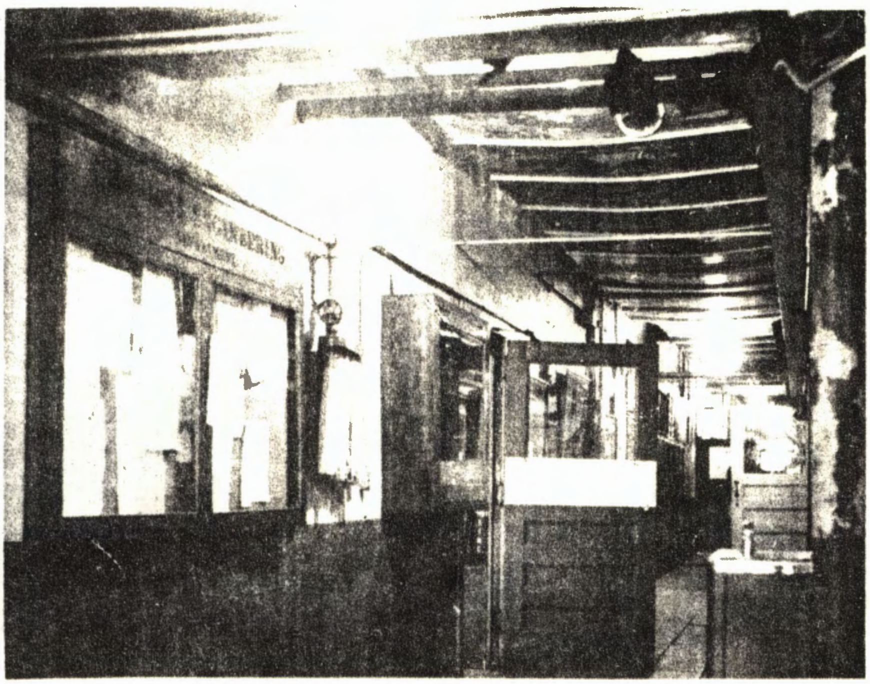
TOP: JIM (THE HOG) LAUGHLIN, MEL HOOVER, RON KOVACH, DAE SIK (THE NUMBER ONE SON) KIM AND BILL TODD ADMIRE THE MYSTERIOUS DRYING MACHINE.

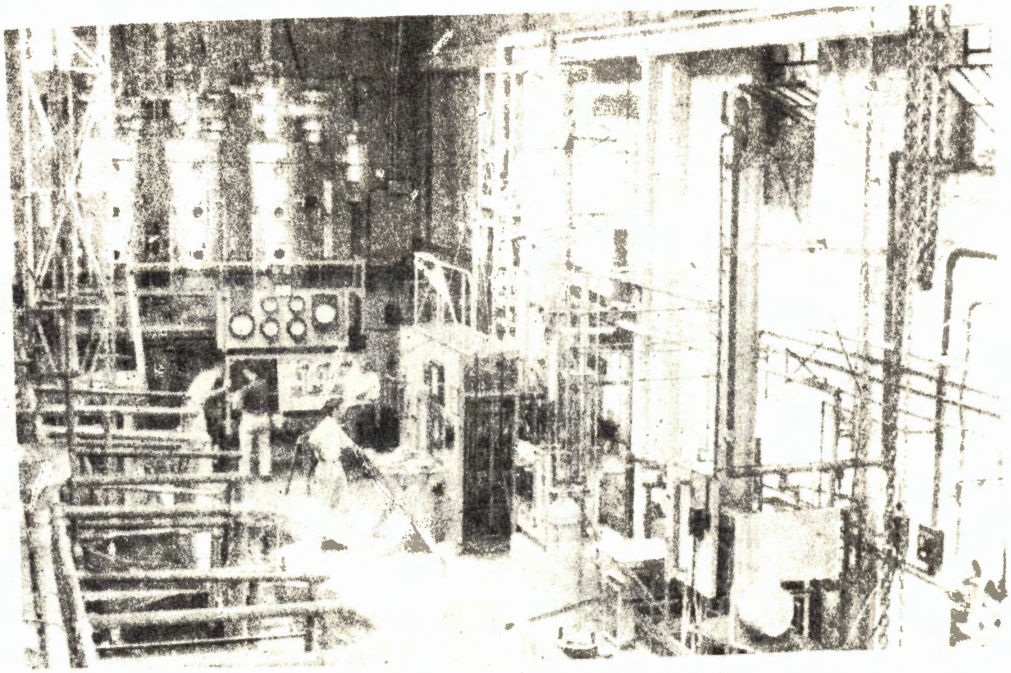
BOTTOM: SANFORD (SAM) BLOOM AND BILL PALMER ARE KEEPING THE FURNACE GOING, (SO THAT EVERYBODY CAN HAVE HOT WATER IN THE SAFETY SHOWERS!)

"THE BLACK HOLE OF CALCUTTA"
(ILLUSTRATION NOT AVAILABLE
IT WAS BEFORE OUR TIMES.)

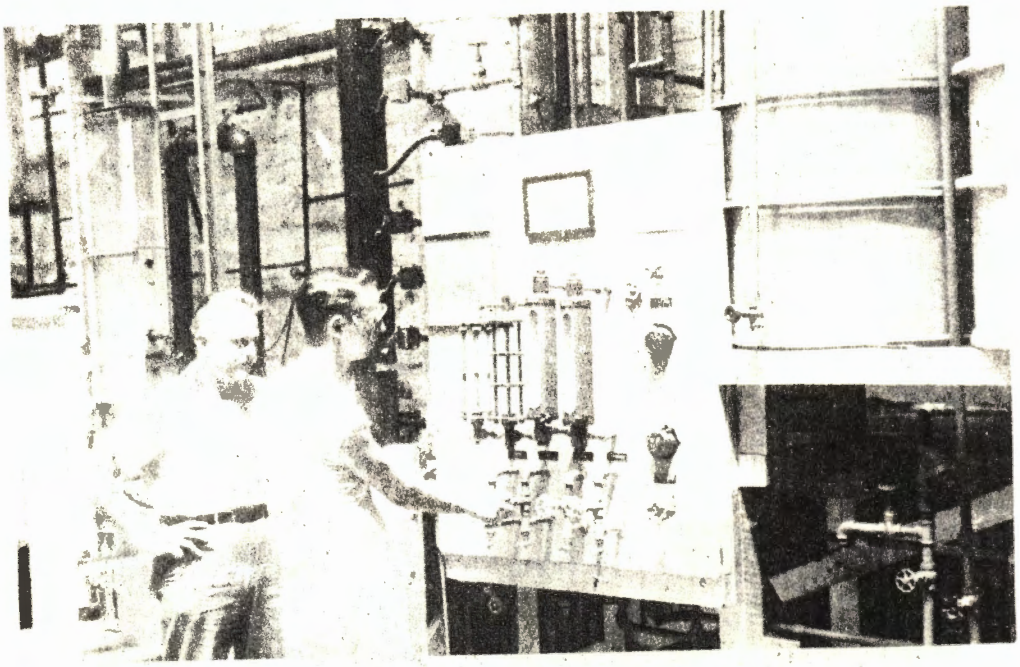


"THE DUNGEON"
(WE LIVED IN THIS ONE)





TOP: A CORNER OF THE UNIT OOOPS.
BOTTOM: JULIUS FORIS AND LEE ADDIE WONDERING ABOUT THE GUMMED UP FLOWMETER.



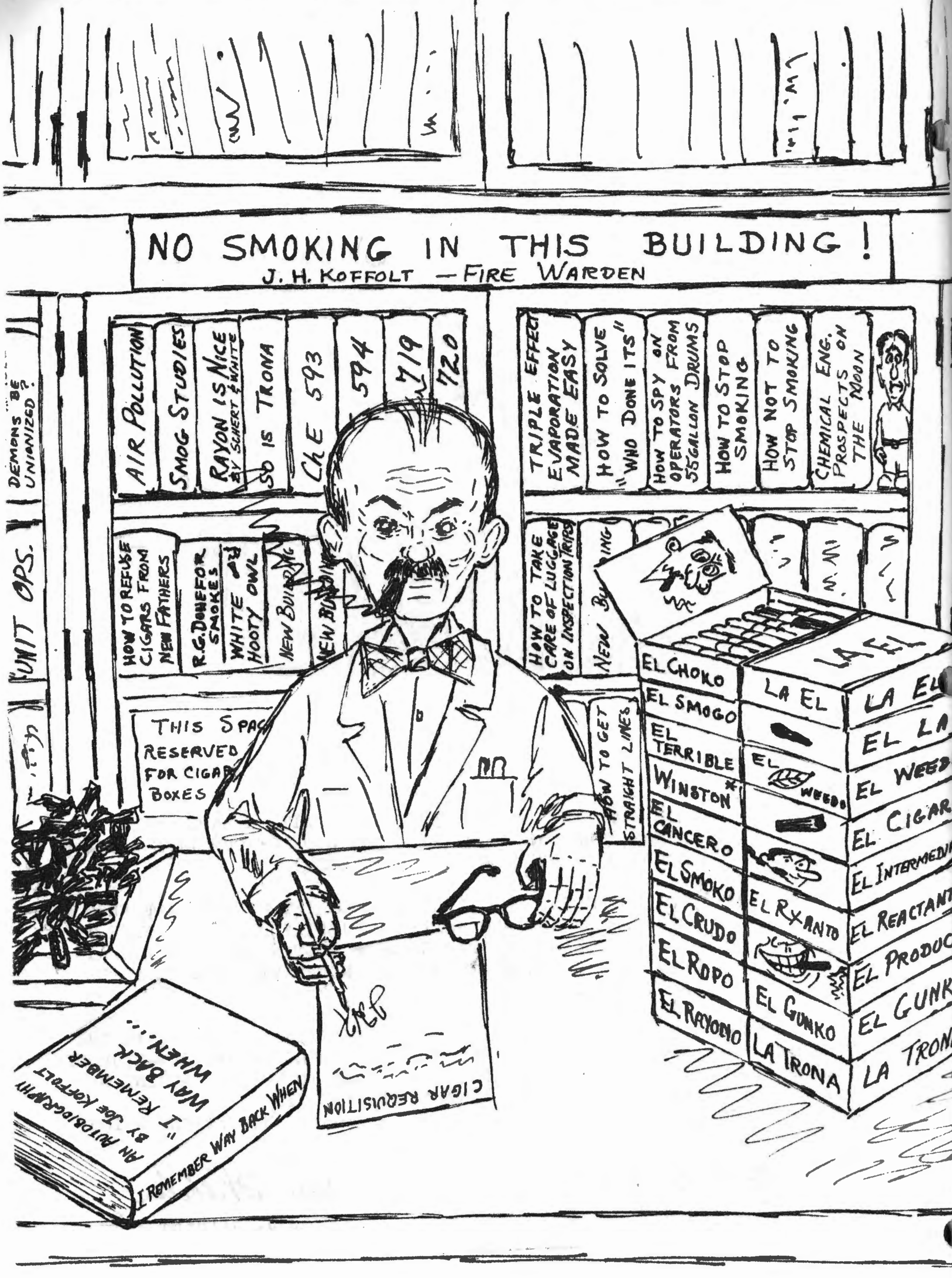
ART: DON WILHEIM, (ONE OF THE JEWELS WITH A RARE SENSE OF HUMOR, WHO SAW BEST THE FUNNY SIDE OF OUR LIFE WHILE WE STUDIED TO BE CHEMICAL ENGINEERS.)

PHOTOGRAPHY: JULIUS FORIS, JR., (WHO DID NOT LET MANY ESCAPE FROM HIS CAMERA AND WHO WAITED PATIENTLY UNTIL THE HAIR - DOS OF JOE'S SECRETARIES WERE JUST RIGHT. HE WAS AIDED BY HIS "WALKING TRIPOD," RON DAVIS, WHO TOOK THE ABOVE PHOTOGRAPH.)

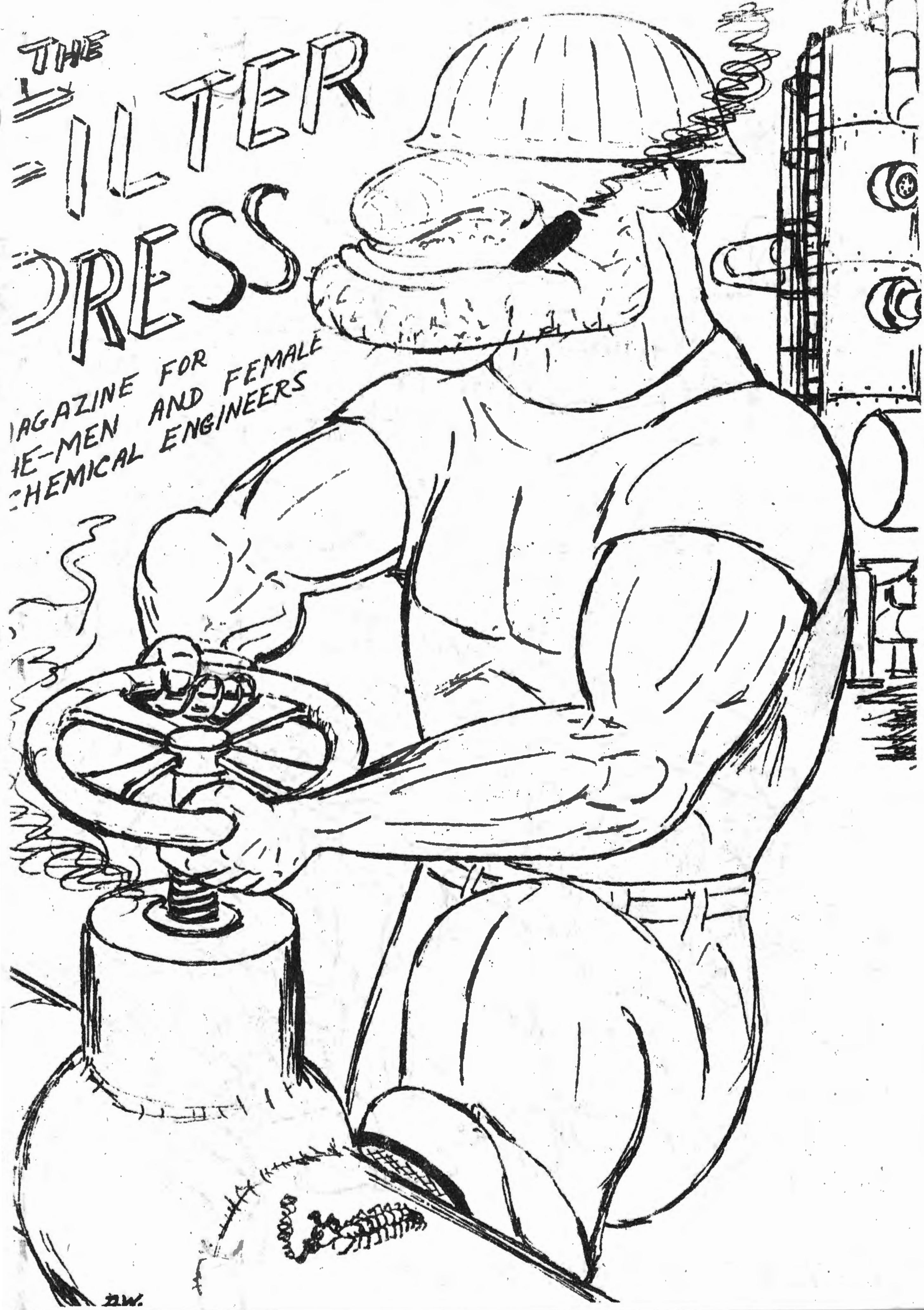
IT WAS OUR SINCERE DESIRE, WHILE COLLECTING AND PRODUCING THE MATERIAL FOR THIS BOOK, TO PRESENT OUR PROFESSORS AND FELLOW-STUDENTS WITH A SOUVENIR OF THE YEARS WHICH THEY SPENT IN THE DEPARTMENT OF CHEMICAL ENGINEERING AT THE OHIO STATE UNIVERSITY.

WE WISH TO THANK EVERYONE FOR THE HELP AND SUGGESTIONS WHICH ENABLED US TO HAND THIS YEAR-BOOK OVER TO YOU.

Julius Foris jr | Don Wilhelm
JULIUS FORIS, JR. | DONALD J. WILHELM



*I CAN'T FIGURE THIS ONE OUT EITHER; DON WILHELM


THE
ILTER
RESS
AGAZINE FOR
E-MEN AND FEMALE
CHEMICAL ENGINEERS
D.W.

RELUCTANT DEPARTURE

INTELLIGENTLY RESOLVING THE ANSWER TO A GROUP PROBLEM

KEEN AND WILLING OBSERVERS ECSTATICALLY AWAITING THE INSPECTION TRIP

DIE GROSSE TAG KOMMT, UND
DAS NEUE CHEMIKALISCHE ENGINEER
IST FREULICHE —— NUN ER
KANN VIELE GELD AUF PEILEN.

APPENDIX IV

W

21ST

ANNUAL REPORT

To The Chemical Engineering Alumni
The Ohio State University

COVER PAGE

The cover page is a photograph of some members of the staff and the 1969 graduating class.

First Row (Left to Right)

Kerscher, F. C.
Strong, A. W.
Bergraff, S.
Frazier, B., Secy.
Koffolt, J. H., Prof.
Kasim, (Owotomo) M., Mrs.
Turner, S., Secy.
Barrick, S.
Green, L. H.

Second Row (Left to Right)

Foisset, R. A.
Newhouse, H. A.
Youmans, D.
Syverson, A., Prof.
Reese, D.
Smith, D. E.
Sebert, J. W.
Michl, P. R.

Third Row (Left to Right)

Brodkey, R. S., Prof.
Lynn, R. E., Prof.
Sweeney, T. L., Prof.
Nazem, F.
Kreglewski, A. J., Prof.
Geankoplis, C. J., Prof.
Hershey, H. C., Prof.
Goldwein, N.

Fourth Row (Left to Right)

Svanks, K., Prof.
Smith, E. E., Prof.
Stolk, R. D.
Kuon, J. F.
Lull, D.
Hafeez, A.
Haberkost, R. D.
McMillan, M. L.
Kay, W. B., Prof.

Fifth Row (Left to Right)

Tanner, J. B., Adm. Asst.
Kukla, M. B., Mechanic
Flerchinger, J. M.
Havlice, R. F.
Pak, S. C.
Baxter, R.
Salladay, J. M.
Walters, D. J.
Lindsay, G. A.
Fergusson, W.
Doub, T.
Linak, R. T.

21ST

ANNUAL REPORT

To The Chemical Engineering Alumni
The Ohio State University

Greetings from the Chemical Engineering Staff:

I am glad to have this opportunity to express our appreciation for your interest and help and to review the major events of the Department during the past year. The photograph on the cover of the Class of 1968 is appropriate at this time because it is the twentieth class to graduate while Joe Koffolt was chairman. The Department has been fortunate to have had two great leaders - Withrow and Koffolt. It is going to be a real challenge to try to measure up to their standards; I welcome the opportunity and I know I can count on your help from time to time.

The high light of our ACE Day program last year was the banquet honoring Joe. The fine attendance by alumni and friends was indeed heartwarming.

It was a pleasure to meet so many of you at the Los Angeles Alumni Luncheon, some of you for the first time. This was a splendid meeting - thanks to Don Arnold, Len Harris, and Marv Garrett who made the arrangements. A fine news release on this meeting was prepared by E. P. Arthur and is included later in this report. We are very proud and pleased that Joe was presented the Warren K. Lewis Award by AIChE; we know of no one more deserving. We are also proud of our two 1968 AIChE Student Contest Problem winners - Bill Ferguson and John Salladay. They took part in a student workshop session on the problem and were presented awards at the L.A. meeting - Bill, Second Place and John, Honorable Mention. Thanks to du Pont and Dow Chemical For making it possible for them to attend and represent O.S.U. at this national event.

Since his retirement from the Chairmanship last July 1, Joe continues to handle our placement work and to teach the courses that he has offered in the past. He welcomes being relieved of the administrative responsibilities and is looking forward to renewing his research in azeotropic and extractive distillation. The University has a centennial celebration next year and each department has been asked to prepare a history of its development. Joe is doing this for Chemical Engineering and he may contact some of you for information. He has graciously consented to compile the annual alumni report again this year, as he has done for so many years and for which we are most grateful.

Last year Dr. R. Emerson Lynn, Jr. joined us to start the Polymer Engineering program and this is well on its way. Last fall Dr. Edward J. Freeh (B.S., University of Dayton; M.S., MIT; Ph.D., Ohio State, 1958) joined our staff to develop courses and research in process dynamics and control, mathematical modeling and simulation. Ed and Emy are joining forces to develop a program in mathematical modeling and control of polymer engineering operations. We have been offered an extrusion line from Sinclair-Koppers (thanks to Dick Saylor, '52) and we are negotiating for additional experimental polymer processing equipment as well as a process control computer. Professor Brodkey was chairman of a session and presented two papers at The 5th International Congress on Rheology, Kyoto, Japan in October 1968. Professor Slider who directs our Petroleum Engineering program, offered a short course last summer in "Fluid Flow and Displacement in Petroleum Reservoirs" which was very well received; two similar courses will be offered this summer. Professor Kay along with Professor Aleksander Kreglewski (Visiting Associate Professor in our department) have been doing some excellent research on new methods for estimating physical properties of mixtures, and they hope to be able to announce some important results in the near future. Professor Hershey spent last summer with the American Oil Company in Whiting, Indiana and has made good progress in developing new courses in the fields of optimization and application of statistics to experimental design; one of his interesting research projects deals with drag reduction in the flow of fluids. Dr. Geankoplis continues his research in mass transfer and spent last summer with General Mills in Minneapolis. Dr. Smith has taken over our nuclear engineering program along with his many other duties in sponsored research, including acid mine drainage in the state of Ohio. Ed was promoted to the rank of full professor last year. Dr. Svanks continues his close association with Engineering Experiment Station research. Professor Haering has taken over the graduate work in reaction kinetics and spent his quarter off with Procter & Gamble in Cincinnati. Professor Sweeney is developing our air pollution program as well as continuing his interest in heat transfer. He spent last summer at the E.I. DuPont Plant in Circleville. Professor Sheets has devoted many years to research on water pollution control. Recently, a laboratory in the Water Resources Center on our campus was named in his honor.

Professors Brodkey, Geankoplis, Hershey, and Sweeney are co-authoring a textbook tentatively entitled "Transport Phenomena" which is to be used at the undergraduate level. These men have done a commendable job of teaching in this field, and I am sure the textbook will be equally good; I expect this to be an important contribution to Chemical Engineering education.

As mentioned in the report last year, the College of Engineering has adopted a new four-year program for the Bachelor's degree. We have been busy organizing programs and courses to make the change. Jim Tanner, our administrative assistant, has done an outstanding job in handling the many details connected with this and other departmental functions.

A very pressing problem for the immediate future is that of maintaining our graduate enrollment for next year. Students are no longer deferred from military service for graduate study. We have a few returning from industry and this may become a trend for the future. The undergraduate enrollment remains nearly constant - but too low. The College of Engineering and our department have many programs underway to encourage high school students to take engineering. Your assistance in this mission would be very helpful.

On behalf of the Chemical Engineering staff. I want to emphasize how much we appreciate the most generous support you have provided through the Chemical Engineering Equipment Development Fund. This assistance provides that "extra" force at the right time that makes 2 + 2 = 5. The first Dr. James R. Withrow Memorial Scholarship award was made this year to Terry Groh, a fourth year student in chemical engineering. I would like to bring to your attention that a new fund has been initiated, "The Joseph H. Koffolt Undergraduate Scholarship Award in Chemical Engineering"; the interest from the fund will support a scholarship in the beginning and we sincerely hope that the principle will grow sufficiently to support a fellowship and eventually a Professorship or Chair in Chemical Engineering in Joe's honor. Should you wish to contribute to one or more of these funds, I will submit the following information to simplify the procedures for you and to assure placement of the gift in the proper fund.

The Ohio State University Development Fund

	Project Name	Development Project Number
1.	Joseph H. Koffolt Undergraduate Scholarship Award in Chemical Engineering Fund	2427
2.	Dr. James R. Withrow Memorial Scholarship Fund	2398
3.	Department of Chemical engineering Equipment Fund	5659

We are, indeed, proud of the achievements of our alumni, and I want to encourage you to keep us informed of promotions, honors or awards that are granted to you. This information is of value to us for personal reasons (one of the greatest rewards a teacher receives is to learn of successes of former students); it is also to the department's credit to have such distinguished alumni group.

The 1969 Annual Conference for Engineers is scheduled for Friday, May 23. We look forward to this occasion and hope that many of you will be able to attend.

Best wishes from all of us on the Chemical Engineering staff.

Sincerely,

Aldrich Syverson

March 31, 1969

Dear Jewels:

This letter supplements Dr. Syverson's letter which is given in this report. It always makes me feel so good to write all of you. Although in many cases some are very far away. In going over the mailing list brings so many to mind.

I am sorry that this year I was unable to send you greetings at Christmas time. I did get some out, but I still have several hundred cards which are still in the original box. I went down with the Garden type variety of the flu and (American) just before Christmas. This put a halt to addressing Christmas cards. I had hoped that I could send out New Year's cards, but I went down with the Oriental flu which knocked me out for over five weeks. But in this report I can wish all of you best wishes for a very successful and Happy 1969.

I do hope that you come and visit with us on

ACE DAY - MAY 23, 1969

Last year we broke all records this is evidenced by the photographs given in this report. The class of 1943 broke all records.

I am enjoying my retirement as department chairman. My successor, Dr. Syverson, is doing an A-1 job. We had hoped to spend one or two months in Florida but never made it with the flu, overdosage of high blood pressure pills, and a backlog of work in this transition. I did not care to go away. I hope to be able to do so next year (God be willing).

THE CENTENNIAL YEAR CELEBRATION - THE OHIO STATE UNIVERSITY

The Ohio State University will celebrate its Centennial Celebration in 1970. Each department has been requested to appoint someone to write a history of their particular department. I have been selected to do this for Chemical Engineering.

In going over the photographs I found none of our laboratories in the "Black Hole of Calcutta". This was located in the basement of what is now Derby Hall, and which at that time was known as the Chemistry Building. I have written to the living members of the classes 1906 to 1925 asking them to send me any photographs they might have of the "Black Hole" lab.

In 1925 Chemical Engineering was split off from Chemistry and was made a separate department. The laboratories were moved to the southeast corner of McPherson. Chemical Laboratories which at that time was known as the new Chemistry Building. It was named after McPherson after his death in the 1940's. The late Dean MacQuigg dubbed these quarters as the "Snake Pit". In 1959 Chemical Engineering moved into its present quarters. We have ample photographs of the equipment in McPherson and our present building.

I would also be interested in inspection trip photographs for the same period of time 1906 to 1930. All of these photographs will be returned.

DATA CARD - ALUMNI CHEMICAL ENGINEERING DEPARTMENT

We would appreciate it if you will fill out the enclosed data card. I hope we get 100% response to this. The data obtained will be classified by companies and published in the history of the department. This was done in 1958 and has been very useful. Your cooperation will be very much appreciated. We will be happy to send you a copy if you request it.

MAIL THESE DATA CARDS AS SOON AS YOU RECEIVE THIS REPORT

ACE DAY - 1968

All attendence records were broken in the 1968 ACE Day held May 24, 1968. It was on this day I started to "sing my swan song" as department chairman. All three hundred in attendence in the afternoon session which was held in the Unit Operations Laboratory. Our large lecture room seats about 120. Two hundred and seven stayed over for the buffet dinner at the Ohio Stater Inn. Every table was taken by our group.

I will always be grateful for the turnout, presents, and the citation received from many places.

The Standard Oil Company (Ohio) made a contribution of $275.00 to pay for the luncheon of some 100 third, fourth and fifth year students on ACE Day. We appreciated this very much and thank both Mr. Charles E. Spahr, President of Sohio and Larry Faflick for this.

I am very proud of a perpetual motion clock which was given me by Union Carbide Corporation, Chemicals and Plastics Division. The presentation was held in my office and the photograph is shown in this report by the group from Carbide. There is a name plate engraved in this clock "Presented to Joseph H. Koffolt in recognition of invaluable contributions to the Chemical Industry. Union Carbide Corporation, Chemicals and Plastics Division, May, 1968."

The following citation was presented by the Council of the American Institute of Chemical Engineers which read as follows:

"In grateful appreciation for his lifelong devotion to Chemical Engineering, for his skill and patience as a leader and teacher, for his exemplary adherence to the highest ideals of a professional calling, the Council of the American Institute of Chemical Engineers offers this Testimonial to the indebtedness of the Profession to a great Chemical Engineer." Signed by members of council.

Max S. Peters, President	T.W. Tomkowit, Director
H. D. Guthrie, Vice President	George H. Cummings, Director
Theodore A. Burtis, Past President	T. Weaver, Director
George E. Holbrook, Treasurer	Arthur L. Conn, Director
F.J. Van Antwerpen, Secretary	John L. Olsen, Director
Frank C. Croxton, Director	Irving Leibson, Director
E. B. Christiansen, Director	J. W. Westwater, Director
J. B. Martin, Director	William W. Ellis, Director

J. J. Martin, Director

Another citation from the Central Ohio Section American Institute of Chemical Engineers confirmed upon me the permanent title of "honorary chairman of the Central Ohio Section American Institute of Chemical Engineers*.

Warren K. Lewis award for distinguished contributions to Chemical Engineering education. As stated by Dr. Syverson, the Warren K. Lewis award was given me last December at the Los Angeles meeting of the A.I.Ch.E. This award consisted of $2,000 all expense paid trip to Los Angeles to receive the award and the following citation: "For his inspiring and pervasive influence on Chemical Engineering through the many students who have drawn their perception of the profession, their skills, and their devotion from his exemplary scholarship, teaching, and humanity.

I felt it a great honor to receive this award as it put us in the major leagues of Chemical Engineering education. Previous recipients of the Warren K. Lewis Award were Barnett F. Dodge (Yale), Olaf A. Hougen (Wisconsin), Edwin F. Gilliland (M.I.T.), Richard H. Wilhelm (Princeton) (deceased), Donald L. Katz (U. of Michigan).

*Dr. Dan Duncan Note

ALUMNI MEETING OF OHIO STATE CHEMICAL ENGINEERS - LOS ANGELES, CALIFORNIA

The following is an account of Chemical Engineering Alumni, Tuesday, December 3, 1968. This was written by Edwin P. Arthur, B.Ch.E. '22 who resides at 5110 Las Paldas, California 92632.

"Ohio State was well represented at the December (1968) meeting of the American Institute of Chemical Engineers. Some forty six University alumni attended a luncheon to become acquainted with Dr. Aldrich Syverson, recently named Chairman of the Department of Chemical Engineering. A wide spectrum of the chemical industry was shown by those graduates attending. Dr. Joseph H. Koffolt, retired Department Chairman, introduced each one and recounted some interesting highlights from his career; without notes and very little prompting. It was quite a remarkable feat and illustrates the warm personal feeling for his students cultivated by Dr. Koffolt in his many years at Ohio State. Ohio State's Chemical Engineers often refer to themselves as "jewels". General agreement to "Joe" as one of the most precious "stones" of all!"

"Dr Koffolt was honored at the American Institute of Chemical Engineers Meeting with the Warren K. Lewis Award. The many complimentary remarks illustrated the achievement of this well loved teacher and mentor for so many who came under his influence at Ohio State."

The jewel nickname was actually an invention of some unknown student of the late Dr. James R. Withrow, Department Founder. It's an oblique reference to the poverty-stricken Cornelia, a Roman Matron, who pointed to her children when asked about her lack of jewelry. Ohio State can certainly thank Dr. Koffolt for his efforts on so many "diamonds in the rough" and take some share of pride in the sparkling success of so many alumni in Chemical Engineering.

With kindest personal regards. Come back May 23 and be sure to fill out the card and send it in.

Joe

THE OHIO STATE UNIVERSITY

DEPARTMENT OF CHEMICAL ENGINEERING

CURRICULUM LEADING TO THE DEGREE OF BACHELOR OF SCIENCE IN CHEMICAL ENGINEERING, EFFECTIVE SUMMER QUARTER, 1969

FIRST YEAR		HOURS
AUTUMN	Chem 121 (General Chemistry).	5
	English 101 (Composition and Reading)	3
	Math 151 (Calculus and Analytical Geometry)	5
	Physical Education 101.	1
	Survey.	1
	National Defense Option (ROTC or Academic)	
WINTER	Chem 122 (General Chemistry).	5
	Engr. Graphics 110 (General Engr. Graphics)	4
	Math 152 (Calculus)	5
	Health Education 101 (Hygiene).	1
	Physical Education 102	1
	National Defense Option (ROTC or Academic)	
SPRING	Chem 123 (General Chemistry).	5
	English 102 (Compositon and Reading).	1
	Engr Graphics 200 (Computers)	3
	Math 153 (Calculus)	5
	Physical Education 103	1
	National Defense Option(ROTC or Academic)	
SECOND YEAR		
AUTUMN	Chem 251 (Organic Chemistry)	3
	Chem E. 400 (Principles I).	3
	Math 254 (Calculus)	5
	Physics 131 (Particles and Motion).	5
	National Defense Option (ROTC or Academic)	
WINTER	Chem 252 (Organic Chemistry)	3
	Chem E 401 (Principles II).	3
	Math 255 (Differential Equations)	5
	Physics 132 (Waves and Quanta).	5
	National Defense Option(ROTC or Academic)	
SPRING	Chem 253 (Organic Chemistry).	3
	Chem E 520 (Transport Processes).	3
	Physics 133 (Physical Systems and Electrodynamics). . .	5
	Basic Education Requirement[1].	5
	National Defense Option(ROTC or Academic)	

THIRD YEAR

		HOURS
AUTUMN	Chem 254 (Organic Chem Lab)	3
	Chem 531 (Physical Chemistry)	3
	Chem E 521 (Transport Processes II)	3
	Engr Mech 215 (Statics and Strength of Materials)	5
	Math 512 (Fourier Series and Boundary Value Problems)	3
		17
WINTER	Chem 532 (Physical Chemistry)	3
	Chem E 608 (Thermodynamics I)	3
	Chem E 611 (Transport Processes III)	3
	Chem E 725 (Chemical Process Control)	3
	Basic Education Requirement[2]	5
		17
SPRING	Chem 533 (Physical Chemistry)	3
	Chem 541 (Physical Chem Lab)	3
	Chem E 609 (Thermodynamics II)	3
	Chem E 612 (Operations)	4
	Chem E 685 (Inspection Trip)[3]	2
	Basic Education Requirement[2]	5
		20

FOURTH YEAR

SUMMER	Chem E 730 (Operations Laboratory)	8
		8
AUTUMN	Chem E 610 (Reaction Kinetics)	3
	Chem E 750 (Profession of Chem E)	1
	Chem E 760 (Economy)	3
	English 305 (Technical Writing)	3
	Technical Elective Program[2]	3
	Basic Education Requirement[2]	5
WINTER	Chem E 762 (Chemical Process Development)	4
	Technical Elective Program[2]	9
	Basic Education Requirement[2]	5
		18
SPRING	Chem E 764 (Chemical Process Design)	5
	Technical Elective Program[2]	6
	Basic Education Requirement[2]	5
		16

FOOTNOTES:

1. A student who starts with Math 150 will finish Math 255 during Winter Quarter, Second Year and must schedule the 5 hours of Basic Education Requirement at some later time convenient to the student's schedule.

2. The Technical Elective Program will be arranged by the student in consultation with his faculty adviser. A total of 18-credit hours of technical electives will be required and will be arranged with emphasis in one of the following technical areas:

a. Advanced Engineering and Science
b. Environmental Engineering
c. Nuclear Engineering
d. Optimization and Advanced Mathematical Methods
e. Petroleum Reservoir Engineering
f. Polymer Engineering
g. Process Analysis and Design
h. Process Dynamics and Simulation

In order to provide some broadening in technical fields, at least 5 credit hours of work in the Technical Elective Program will be taken outside the Department, preferably in other areas of engineering or in the basic sciences. The Basic Education Requirement of 30-credit hours will also be considered in the total elective program. Selection and scheduling will be accomplished with the help of the student's adviser.

3. The Inspection Trip is conducted in the period between Winter and Spring Quarters. Students will register for Chem F 685 during Spring Quarter registration.

THE OHIO STATE UNIVERSITY
DEPARTMENT OF CHEMICAL ENGINEERING

March 26, 1969

SALARY OFFERS FOR 1968-1969 (DATA INCOMPLETE - AN UP-TO-DATE LISTING WILL BE AVAILABLE JUNE 15, 1969)

Underlined salary offer accepted.

BACHELOR OF CHEMICAL ENGINEERING (5 years)

No.	Salary Offers
1.	950, 900, 850, 850, 1000, 925, 880, 885, 835, 888
2.	900, 885, 835, <u>1166</u>, 1000
3.	875, 850
4.	880
5.	890
6.	885
7.	Working Towards M.B.A.
8.	855, 865, 875, 845
9.	890, 860, 860
10.	<u>1166</u>, 825, 900, 1000
11.	915, 940, 970, 915
12.	To Nigeria
13.	650, 710, 685 summer
14.	To U.S. Navy
15.	900,900, 840, 900
16.	915, 900, 870, 895, 866, 840, 920
17.	925

COMBINED BACHELOR OF CHEMICAL ENGINEERING AND MASTER OF SCIENCE

1.	900
2.	To U.S. Army
3.	1000, 1075
4.	1000, 1000, 1025, 1015, 1100, 1000, 1025
5.	<u>1000</u>
6.	910, 910, 950, 940, 915
7.	975, 1015, 1008
8.	990, 990, 1000, 975
9	1000

MASTER OF SCIENCE

1.	To Jordan
2.	<u>925</u>, 955, 970, 970, 925 955
3.	To Peru
4.	To Peru
5.	965, 975, 910, 935
6.	To Brazil
7.	To Mexico
8.	985, 950, 925
9.	950, 930, 950, 900, 929, 950
10.	1080, 950, 835, 1000, 983, 950, 1020, 1020
11.	950
12.	870

SALARY OFFERS FOR 1968-1969 (continued)

MASTER OF SCIENCE

13. To Peru
14. To Puerto Rico
15. 900, 950, 900, 905, 950, 925, 925, 940, 960, 949, 975, 1000, 925, 950
16. To India
17. To Peru
18. 950, 915, 920, 925
19. 10, 154
20. 900, 970, 900, 900, 950, 900, 960, 900, 950, 970
21. 950, 915, 940

DOCTOR OF PHILOSOPHY

1. 1225, 1280, 1200, 1225, 1233, 1104, 1225, 1230, 1280, 1225, 1280, 1225, 1225, 1250
2. 1325, 1320, 1320, 1300, 1305, 1320, 1325, 1355, 1400
3. University of Kanpur, Kanpur, India
4. To Sudan
5. 1260, 1260, 1260, 1240, 1240, 1240, 1240, 1200, 1276, 1250
6. 1285, 1150, 1285, 1250, 1200
7. 1175, 1200, 1225, 1200, 1225, 1226
8. 1100, 1225, 1100, 1100, 1100, 1100, 1125, 1050, 1125, 1100
9. 1300, 1320, 1325
10. To Greece
11. 1250
12. 1280, 1275, 1275, 1300, 1300, 1300, 1300, 1300, 1300, 1290, 1200

BIOGRAPHICAL SKETCHES OF THE SPEAKERS

Laurence C. Gerckens, is head of the division of city and regional planning within the School of Architecture, a part of the Ohio State University's College of Engineering. A native of New Jersey, he received a Certificate in Art (with an award for outstanding academic achievement) from Cooper Union, New York, in 1954. From the University of Cincinnati, in 1956, he received the bachelor of science degree in architecture. He was awarded the master of regional planning degree from Cornell in 1958. He has worked as a site development and planning consultant in Bozeman, Montanta, Tempe, Arizona, and Columbus, Ohio. He has taught at Montana State College and Arizona State University. He joined the Ohio State University faculty in 1963. He has written several papers, performed research, and is a frequent public speaker and lecturer. A past director of the Columbus section of the American Institute of Planners, he is currently president of the Ohio Valley Chapter of that group. He is a member of numerous local and regional planning organizations.

Dr. William T. Morris, professor of industrial engineering at Ohio State University, is an honored teacher and prolific author. Born in Concord, New Hampshire, he received the bachelor of science degree from the Massachusetts Institute of Technology in 1950, the master of science degree from Ohio State University in 1953 and the doctorate degree from Ohio State in 1956. Prior to joining the Ohio State faculty in 1954, he was research and development officer for the U.S. Air Force at Wright-Patterson Air Force Base. For the American Brake Shoe Company, New York, he served as commercial and market researcher, sales analyst, and new product specialist. His book, "Management Science in Action," was chosen by the Academy of Management and the McKinsey Foundation as one of the five outstanding books of 1963. Also among his awards are the Ohio State University Alumni Award for Distinguished Teaching, presented in 1965, and the Charles E. MacQuigg Award for Teaching Excellence, presented in 1967. He is author of eight books and author or co-author of more than a dozen papers.

THE OHIO STATE UNIVERSITY
DEPARTMENT OF CHEMICAL ENGINEERING

1968-1969 LIST OF STAFF MEMBERS, FELLOWS, SCHOLARS, RESEARCH ASSISTANTS

PROFESSORS
Aldrich Syverson, Chr.
Robert S. Brodkey
Edward J. Freeh
Christie J. Geankoplis
Webster B. Kay
Joseph H. Koffolt
Edwin E. Smith

ASSOCIATE PROFESSORS
Waldron D. Sheets
Hartzel C. Slider
Thomas L. Sweeney

ALCOA PROFESSORSHIP
Ralph E. Lynn

ADJUNCT ASSOCIATE PROFESSORS
Robert L. Bates
John S. Eckert
John B. Martin

VISITING ASSOCIATE PROFESSOR
Aleksander J. Kreglewski

ASSISTANT PROFESSORS
Edwin R. Haering
Harry C. Hershey
Karlis Syanks

TEACHING ASSOCIATES
Charles N. Carpenter
Dean H. Reber

TEACHING ASSISTANTS
Pete N. Bartram
Rosa Uy

ADMINISTRATIVE ASSISTANT
James B. Tanner

SECRETARY
Betty Frazier

STENOGRAPHERS
Nancy Bole
Jane Sullivan

TECHNICIAN
Michael B. Kukla

MECHANIC
Keldon Latham

FELLOWSHIPS
1. American Oil - Richard D. Stolk
2. Diamond Shamrock Dean H. Reber
3. Esso Research and Engr. - Michael C. Rominger
4. Lubrizol Fellow - John C. Reindl
5. National Science Found. - John H. Becher, Thomas W. Doub, Jr., Paul D. Jachimiak
6. NASA - Michael McMillan
7. Procter and Gamble - David M. Koenig
8. Louis A & Lucille Roberts Memorial - Stavros Nychas
9. Union Carbide Corp. Wayne R. Fontaine
10. University Dissertation Fellow - Kiu H. Lee

SCHOLARSHIPS
1. Goodyear Foundation - James L. Braun
2. James R. Withrow - Terry S. Groh
3. Mobil Oil Corp - Wayne E. Ballantyne
4. Monsanto Company - Smith E. Howland
5. Owens-Corning David R. Grove
6. Pan-American Pet. Corp. Thomas T. Duvall
7. Rohm & Haas Co. - Robert D. Litt, Danley B. Wolfe
8. Shell Oil Pet. - John J. Curran
9. Standard Oil of Calif. - James F. Dietz
10. Union Bag-Camp Paper Corp Geoffrey A. Prentice
11. Union Carbide Corp. Charles Klingensmith

SCHOLARSHIPS (contd.)
12. Union Oil Co. - Jay A. Kaplan
13. Universal Oil Products - Michael S. Lerch, John W. Toussant

RESEARCH ASSOCIATES
Emil Medniss
Paul Smith

GRADUATE RESEARCH ASSOCIATE
Arthur H. Morth

GRADUATE RESEARCH ASSISTANT
William E. Ferguson

GRADUATE RESEARCH ASSOCIATE
RESEARCH FOUNDATION
Thomas Coffey
Miss Mamata Dutta
Sung Chun Pak
Anandha Rao
Kyral Wylie

A I D FELLOW
C G Guttman
J F Kuon

PROGRAM

The Sixteenth Annual Conference for Engineers
and
The Fortieth Annual Homecoming of the Department of Chemical Engineering

MORNING SESSION

8:30 REGISTRATION and tours of facilities, Hitchcock Hall Lobby
2070 Neil Avenue (at Woodruff Avenue)

9:30 MORNING SESSION (Hitchcock Hall Auditorium) Presiding Harold A. Bolz, Dean, College of Engineering

"The Design Professions and Urban Development", Laurence C. Gerckens, Associate Professor of City and Regional Planning, School of Architecture The Ohio State University

Presentation of Texnikoi Outstanding Alumnus Award

"Science, Intuition, and Management Decisions", Dr. William T. Morris Prof. of Industrial Engineering, The Ohio State University

LUNCHEON SESSION

12:00 LUNCHEON SESSION, Ohio Union Ballrooms, Presiding - Marion L. Smith, Associate Dean, College of Engineering

Recognition of Alumni Anniversary - Classes of 1919 and 1944

Recognition of "Engineering Honor Students"

Presentation of the "DISTINGUISHED ALUMNUS" Awards

Presentation of Benjamin G. Lamme Medal

An Alumni Viewpoint, J. Wesley Leas, General Manager Valley Forge Operations, Control Data Corporation, Norristown, Pennsylvania and College Representative to Alumni Advisory Board

DEPARTMENTAL SESSIONS

Departmental of Chemical Engineering, Chemical Engineering Building, Rm. 207

2:00 Welcome to Alumni and Guests - Aldrich Syverson, Chairman

Introduction of Anniversary Classes - Joseph H. Koffolt
1909, 1914, 1919, 1924, 1929, 1934, 1939, 1944, 1949, 1954, 1959, 1964

Introducing the Golden Anniversary Class of 1919

Living

Walter M. Krieger, James Thomas Robson, Melvin Edwin Schulz, Chester McKinley Wolcott, Charles Newton Ward

Deceased

Howard Foster Anders, Harold R. Nicklaus, John Mouk Ort, Edward O'Rourke J. G. Ralston, Hobart William Seyler

2:45 Latest Department Research Programs:

Polymers - Dr. R. Emerson Lynn

Process Control - Dr. Edward J. Freeh

Those who wish to socialize may do so in the Unit Operations laboratory Room 117 where refreshments will be available until 5:00 p.m.

3:15 Informal Research Seminars:

Adsorption and Catalysis - Dr. Aldrich Syverson Room 423

Critical Properties of Liquids - Dr. Webster B. Kay Room 436

Problems of Fluid Dynamics in Chemical Engineering, Mixing and Turbulence, Rheology, Two- Phase Flow - Room 306
Dr. Robert S. Brodkey

Mathematical Modeling, Process Dynamics and Control - Room 333A
Dr. Edward J. Freeh

Mass Transport Phenomena of Liquids and Gases in Heterogeneous Media
Dr. Christie J. Geankoplis Room 333B

Polymer Research and Instruction Program - Room 421B
Dr. R. Emerson Lynn

Coal Research, Petroleum Refining Research, Reaction Mechanism Studies, Development of Analytical Methods, Nuclear Chemical Engineering
Dr. Edwin E. Smith and Dr. Karlis Svanks - Room 103 and 407

Drag Reduction - Dr. Harry C. Hershey Room 321B

Air Pollution, Heat Transfer - Dr. Thomas L. Sweeney Room 435A

Water and Waste Water Treatment Process - Water Resources Center 1791 Neil Ave.
Professor Waldron D. Sheets

Miscible Displacement in Petroleum Reservoirs - Room 335A and Room 425
Professor H. C. Slider

Kinetics and Catalysis - Room 335B Dr Edwin R. Haering

4:00 Social Hour - Unit Operations Lab, Room 117

6:00 Anniversary Class Reunions, Ohio Stater Inn, East Woodruff and North High

FELLOWSHIPS, SCHOLARSHIPS, GRANTS-IN-AID AND OTHER CONTRIBUTIONS TO THE CHEMICAL ENGINEERING DEPARTMENT

Words cannot express my thanks for the generous contributions to Chemical Engineering education made by the many companies and agencies listed below. Without their help, it would be impossible to have a graduate program. Our research would be still in the Baume hydrometer stage. The undergraduate scholarships have helped many worthy students, especially those on a combined program where they have a laboratory on the campus the first five weeks between the summer and autumn quarters and then an extra quarter to complete their research. These are indicated in the table below.

FELLOWSHIPS

1. American Oil Foundation
2. Dow Chemical Company
3. Diamond Shamrock Company
4. Koppers Company Teaching Fellowship
5. Shell Companies Foundation
6. Union Carbide Corporation
7. Lubrizol Corporation
8. Procter and Gamble Company
9. Ohio State University
10. National Science Foundation
11. Louis A. and Lucille Roberts Memorial Fellowship Fund
12. Arno C. Fieldner Research Fellowship in Chemical Engineering

SCHOLARSHIPS

1. Dow Chemical Company
2. Goodyear Foundation
3. Koppers Company, Inc.
4. Monsanto Company
5. Pittsburgh Plate Glass Foundation
6. Rohm and Haas Company
7. Standard Oil of California
8. Union Camp Corporation
9. Universal Oil Products Company
10. Dr. James R. Withrow Memorial Scholarship Fund

GRANTS-IN-AID AND OTHER CONTRIBUTIONS

1. American Cyanamid Company
2. Diamond Shamrock Company
3. Camille and Henry Dreyfus Foundation, Inc.
4. Dow Chemical Company*
5. Dow Corning Corporation
6. E. I. du Pont de Nemours & Co. Inc.*
7. Esso Education Foundation*
8. B.F. Goodrich Chemical Company
9. Harshaw Chemical Company, Division Kewanee Oil Company
10. Hercules Company*
11. Pittsburgh Plate Glass Foundation
12. Mead Corporation
13. Monsanto Company
14. Union Carbide Corporation*
15. Universal Oil Products Company
16. Mobil Foundation Incorporated
17. Celanese Corporation Fund for Chemical Engineering*

* May also be used for a Fellowship

THE OHIO STATE UNIVERSITY CHEMICAL ENGINEERING EQUIPMENT DEVELOPMENT FUND

Contributions for this worthy cause are still coming in. Many of our alumni are ear-marking their contributions to the Development Fund for the Chemical Engineering Project #5659. The University Administration, including our Dean of Engineering, has done much in the past decade in the uplifting of our Department in the areas of salaries, building, research, equipment, personnel, and travel. Their cooperation with us has been positive. However, it is impossibl for the University to support all of our needs from the budget. The contributions from our alumni and the grants-in-aid from many chemical companies help us materially. These contributions have been very helpful to defray the expenses of getting this report out and for the postage required. The University budget for the Department does not include this item which amounts to over $1,500 per issue. The cost is increased by return mail for reports returned due to incorrect mailing address

IF YOU MOVE PLEASE SEND US YOUR NEW ADDRESS. IT WILL SAVE US OVER $100.00 PER YEAR.

COLLEGE OF ENGINEERING ENROLLMENT, AUTUMN QUARTER, 1968

	1st Year Total	2nd Year	Total Pre-Engr.	3rd Year	4th Year	5th Year	5th Comb. Prog.	Total 5th Year	Total Prof. Engr.	Sum Total
Aero E	138	107	245	54	43	39	6	45	142	387
Agr. E	7	6	13	9	9	3	3	6	24	37
Cer. E	7	5	12	9	7	10	11	21	37	49
Chem. E '68	64	57	121	24	29	15	11	26	79	200
'67	69	46	115	32	21	15	8	23	76	191
'66	98	59	157	21	25	17	14	31	77	234
'65	89	53	142	24	29	13	13	26	79	221
'64	119	54	173	25	27	13	12	25	77	250
'63	71	52	123	29	25	17	10	27	81	204
'62	92	63	155	38	28	11	8	19	72	227
'61	92	61	153	23	18	9	12	21	62	215
Civ. E	48	58	106	36	47	37	6	43	126	232
Elec. E.	154	121	275	100	73	54	20	74	247	522
Ind. E.	10	26	36	46	71	37	8	45	162	198
Mech. E.	75	62	137	67	84	59	14	73	224	361
Met. E.	11	11	22	10	10	9	4	13	33	55
Phys.	13	14	27	11	12	6	8	14	37	64
Weld E.	4	6	10	13	13	5	3	8	34	44
Und.	285	131	416	-	-	-	-	-	-	-
TOTALS	816	604	1420	379	398	254	94	348	1125	2149

SCHOOL OF ARCHITECTURE AND LANDSCAPE ARCHITECTURE

	1st Year Total	2nd Year	Total Pre-Engr.	3rd Year	4th Year	5th Year	5th Comb. Prog.	Total 5th Year	Total Prof. Engr.	Sum Total
Arch	115	71		40	32	29				287
L. Arch	14	4		4	5	7				34
TOTAL REG.	964	696		443	445	310	94	348		2952
Irreg.										29
Part-Time Educ. Oppor.										117
GRAND TOTAL										3098

Included in above totals: Lima = 2, Mansfield = 4, Marion = 2, Newark = 2, Wright-Patterson Air Force Base = 57

DECEASED CHEMICAL ENGINEERING ALUMNI

(Number in Parenthesis Indicates Number of Graduates that Year)

1902
1. Harvey Keating

1904
1. John Hoffhine

1906 (3)
1. Thomas Beer
2. Arno C. Fieldner

1907 (6)
1. Harry R. Drackett
2. Harry E. Surface
3. Dana J. Demorest
4. A. H. Flower

1908 (6)
1. Frank M. Dorsey
2. Charles P. Hoover
3. Paul McDorman
4. Arthur C. Hothstine, Jr.
5. Harry M. Williams

1909 (6)
1. Erwin Sohn
2. O. R. Sweeney
3. Sydney H. Katz
4. H. H. Watt

1910 (7)
1. Ernest H. Grant
2. William D. Lareaux
3. W. A. Richey
4. Lear H. Van Buskirk
5. P. S. Beebe

1911 (11)
1. Harry V. Atkinson
2. Sumner B. Frank
3. Roscoe C. Jones
4. Clarence B. King
5. C. J. Burkley
6. Albert W. Aavison
7. Howard Dock
8. Ralph E. Hall

1912 (11)
1. P. M. Giesey
2. E. S. Boerstler
3. F. J. Montgomery
4. C. E. Veit
5. Walter O. Augustine
6. W. A. Richey
7. B. S. Eberstler
8. T. G. Roderick

1913 (12)
1. Henry N. Case
2. Charles R. Parkinson
3. Albert N. Erickson
4. Reuben L. Walter
5. Howard E. Fritz
6. A. C. Perrin
7. James Brown
8. W. M. Davis
9. Clare O. Ewing, Sr.
10. Virgil A. Moore

1914 (19)
1. Emil H. Balz
2. W. T. Burgoon
3. Paul Cottringer
4. A. A. Chambers
5. Roy D. Fritz
6. L. A. Gregg
7. Edward G. Hines
8. Brice Stewart Hull
9. Lesley S. Jenkins
10. P. R. Morris
11. A. A. Kohn
12. R. W. Shafor
13. A. R. Willis
14. Claud R. McNeil

1915 (20)
1. C. R. Bennett
2. Walter M. Berger
3. Ralph Peter Heikes
4. H. L. Dick
5. Carl W. Simpson
6. J. W. Melick
7. J. O. Lord
8. G. D. Evans
9. A. R. Willis
10. Melvin DeGroote
11. F. C. Dunn
12. Kenneth Kersey
13. C. E. Reiss

1916 (21)
1. M. A. Muskopf
2. Hanford A. Thirey
3. K. W. Reed
4. F. C. Vilbrandt
5. W. F. Brown
6. L. E. Smith
7. J. W. Young
8. Herbert S. Coith

1917 (20)
1. Carl E. Aungst
2. Walter L. Krueger
3. William A. Wirth
4. D. F. Alexander
5. F. L. Sinks
6. H. H. Thompson
7. Fred N. Schaad
8. H. D. Holler (Ph.D.)
9. W. I. Burt
10. Chase R. Bennett
11. E. J. Witzemann

1918 (19)
1. G. A. Burrell
2. A. E. Hess
3. Garland H. Hufford
4. Edwin W. Mann
5. H. Alton Michell
6. J. M. Ort
7. A. H. Vilbrandt
8. A. E. Galloway
9. J. H. Young
10. P. Horton
11. F. T. Andrews
12. S. L. Shenefield

1919 (8)
1. Howard F. Anders
2. J. G. Ralston
3. H. W. Seyler
4. E. V. O'Rourke (Pet. Eng.)
5. Harold R. Nicklaus

1920 (31)
1. Haney C. Howell
2. Louis J. Mathies, Jr.
3. Roy Paster
4. Victor J. Roehm
5. Harold T. Reiner-Ruff
6. Carroll L. Strait
7. Joseph M. Volzer
8. Russell F. Hamilton
9. R. R. Kennedy
10. Fred V. Doutt
11. H. E. Russell - Arch Chem.

1921 (29)
1. Walker F. Spear
2. W. K. Gilkey
3. William Green
4. C. M. Evans
5. John E. Wiss
6. Donald Brooks

7. R. B. Hollenback
8. Henry F. Palmer
9. Herman Bankston
10. Daniel I. Mayne
12. William A. Lotze

1922 (33)
1. Paul R. Hines
2. Walter L. Klaiber
3. Roland M. Kohr
4. R. E. Wolfe
5. R. E. Whinnery
6. Wallace Wing
7. Ben Blumenthal
8. Carl J. Beckert
9. C. A. Ritchie
10. Andrew Karsten
11. Marion Reed
12. H. G. Carrell

1923 (60)
1. R. T. Donham
2. Albert G. Corwin
3. James T. Goff
4. William J. Harrison
5. G. R. Lyon
6. J. L. Roberts
7. J. L. Ware
8. E. N. Prinz
9. Stanley Newbrander
10. C. R. Blanchard
11. Y. L. Pun
12. Howard E. Fritz
13. Frank W. Volk

1924 (28)
1. Carroll M. Allen
2. Raymond S. Carter
3. C. Weis
4. George W. Ruhl
5. Virgil Hutton
6. H. T. Ruff (Ph.D.)
7. Frank J. Koehne

1925 (35)
1. Curtis Balding
2. Lorin E. Lutz
3. Frederick H. MacLaren
4. Adolph Valley
5. John Bowers
6. Chennan Shen
7. Henry F. Palmer
8. S. M. Sun
9. Arthur E. Juve
10. Alfred M. Eyerman
11. F. E. Prior
12. George W. Ruhl
13. R. H. Bancroft

1926 (14)
1. J. Gavin Cullinan
2. J. L. Thoma
3. Mao Han Tuan

1927 (19)
1. Charles W. Hammett
2. Dwight S. Masters
3. Edwin F. Nussdorfer
4. Charles R. Owens
5. L. E. Mong
6. Dwight S. Masters
7. C. E. Fareuff
8. Willard B. Mitchener

1928 (19)
1. Thomas C. Chadwick
2. E. E. Martin
3. Wilson F. Brown
4. E. B. Carr

1929 (24)
1. James Pace Alton
2. Ming Tan Hsieh
3. W. J. Michel
4. E. B. Carr

1930 (34)
1. G. B. Malvea
2. K. M. Sprinkel
3. J. L. Arns
4. John J. Hazel
5. Harold C. Cronenberger
6. H. G. Cooper

1931 (43)
1. T. W. Elslager
2. Adolph Wassertheurer
3. C. J. Black
4. E. B. Carr

1932 (40)
1. Conrad F. Daum
2. David M. Goodfriend
3. Alfred E. Galloway
4. E. C. Piotter
5. William M. Davis

1933 (42)
1. Francis E. Pickering
2. Carl H. Albrecht
3. H. L. Sittler
4. Thomas C. Chadwick (Ph.D.)
5. E. W. Mann
6. Charles Sudman
7. Paul Patton

1934 (39)
1. George K. Dumbauld
2. Lawrence Stout

1935 (66)
1. Harvey C. Gillogly
2. William Swisher
3. Lee Kleinmaier
4. William T. Walton
5. James F. Simpson
6. Harry Conaway

1936 (42)
1. Robert L. Scroggs

1937 (53)
1. Richard M. Abbott
2. Clare O. Ewing, Jr.
3. Leon W. Omwake
4. William C. Shank
5. E. H. Osborne
6. James Braden
7. J. P. Mitchelson
8. Frank A. Vinci

1938 (71)
1. D. J. Gaston
2. Howard J. Orlowski
3. Alexander Newhouse
4. Henry F. Palmer
5. Richard D. Schafer
6. Albert L. Taylor

1939 (69)
1. Robert E. Scheiber
2. Ralph Edwin Hall
3. E. E. Kimmel, Jr.

1940 (73)
1. Carmen Adovasio
2. F. Wayne Beall
3. John R. Linn
4. Robert Mills

1941 (71)
1. John W. Russell
2. W. H. Williams

1942 (67)
1. Vaughn E. Kelly
2. Julian Adam Yocum

1943 (90)
1. M. F. Dick
2. Willis T. Harberson

1944 (28)
1. K. E. Kress

DECEASED (CONT'D)

1945 (14)
1. Roland L. Allen
2. Charles J. Speitz, Jr.
3. Howard Wilkinson
4. J. B. Mitchelson

1947 (103)
1. Sidney Miller
2. Marion G. Dick

1948 (147)
1. H. C. Clafin
2. Dowald Dewey
3. David F. Pickard
4. D. L. Wiggins
5. Robert J. Wygal

1949 (132)
1. Thomas O. Feasel
2. John W. Shook, Jr.

1950 (87)
1. Robert C. Johnston
2. David Pickard

1951 (103)
1. Turney Ferguston
2. John R. Seferian
3. Donald C. Dewey
4. Karl W. Mezgar
5. Harry C. Clafin

1952
1. C. Schlea

1953 (44)
1. Al-Kazimi, Abd Ali M.

1955 (57)
1. Fred C. Ohmeiss
2. Carl S. Scllea
3. Glenn L. Moll
4. William Kaiser

1960 (56)
1. Rolland E. Blosser

NUMBER OF DEGREES CONFERRED BY THE DEPARTMENT

The number of degrees conferred by the Chemical Engineering Department on a cumalative basis is given below and for five yearsperiods are given below. This question has been asked many times. We have data on a yearly basis but it was my thought that this would increase the cost of postage. If anyone would like the data we will be happy to send you a xerox copy of the complete data.

Year	B.Ch.E.	M.Sc.	Ch.E*	Ph.D.	Total
1906	2	0	0	0	2
1910	27	1	0	0	28
1915	102	8	0	0	110
1917	134	17	0	1	152
1920	182	27	1	4	214
1925	296	55	4	19	374
1930	375	81	5	28	489
1935	499	127	10	57	693
1940	691	203	25	72	991
1945	965	238	25	90	1,318
1950	1,196	398	27	116	1,737
1955	1,337	523	28	168	2,056
1960	1,453	615	28	189	2,285
1965	1,582	689	29	213	2,513
1969	1,683	766	29	241	2,719

*Degree abolished in 1963

LOST, STRAYED OR STOLEN ALUMNI IN CHEMICAL ENGINEERING

IF YOU KNOW THE ADDRESS OF ANY OF THESE, WE WOULD APPRECIATE IT VERY MUCH IF YOU WOULD INFORM US. WE WERE ABLE TO FIND OVER 50 WITH YOUR HELP THIS PAST YEAR.

1910
1. E. W. Gorman
2. C. G. Wood

1912
1. W. N. Lorentz

1913
1. A. N. Erickson
2. F. C. Smith

1914
1. W. J. King

1915
1. W. T. Kraner
2. H. Mitzen

1917
1. E. R. Schafer
2. En-Ton-Lee Toma

1919
1. C. C. Keckler

1920
1. Yu Seng Tsen

1921
1. H. W. Hess
2. R. D. Kumajon
3. M.C. Reed

1922
1. V. R. Morris
2. C. V. Pang

1923
1. A. F. Acosta
2. H. M. Davies
3. W. H. Miller
4. H. L. Moon

1924
1. Tien I. Chen

1925
1. C. M. Sun

1926
1. F. C. Davis
2. J. A. Thompson
3. Cho Wu

1927
1. Cheung Ying Chu
2. D. L. Bishop
3. Wei Yang

1928
1. R. B. Goble
2. Chieh Ma

1931
1. Mrs. H. Hsieng

1933
1. N. R. Price

1935
1. E. C. Painter

1937
1. R. V. Cobb
2. C. B. Cross

1938
1. T. K. Wu

1939
1. K. Hoover

1940
1. G. D. Kane
2. C. W. White

1943
1. R. H. Collins
2. A. R. VanKleeck

1947
1. V. Khamneizadeh
2. L. E. Parker
3. J. K. Petry
4. H. L. Sturza
5. J. E. Thompson

1948
1. W. C. Blackwood
2. En Tsch Ming
3. Tan Chin Wang

1949
1. Huan-Yun Hsung
2. Morgan Jones
3. W. C. Miller
4. Chi-Tu Pan

1950
1. D. B. Barnes
2. E. H. Chao

1951
1. B. D. Blackie

1952
1. Roy Choudhury

1953
1. R. F. Hoeckelman
2. M. K. D. Sanghvi

1955
1. G. L. DePablo
2. R. C. Fischer
3. W. E. Kreiner

1956
1. George Abraham

1957
1. A. C. Schulz

1960
1. W. I. Fox

1961
1. B. Harshbarger

1962
1. F. A. Schurtz

1963
1. V. Beuk
2. B. D. Blackie
3. L. K. Schultheis

1964
1. J. Moomaw

1965
1. V. L. DePaola

PLACEMENT OF CHEMICAL ENGINEERING GRADUATES

June, 1968 - December, 1968

BACHELOR OF CHEMICAL ENGINEERING

NO.	NAME	COMPANY AND LOCATION
		June, 1968
1.	Raymond Antoine Foisset	Owens Corning Fiberglas, Newark, Ohio
2.	Richard Dean Haberkost	Shell Chemical, Union, New Jersey
3.	Frederick Carleton Kerscher	Goodyear Tire and Rubber, Akron, Ohio
4.	Gerald Maurice Lehmann	American Oil, Whiting, Indiana
5.	Richard Thomas Linak	Owens Corning Fiberglas, Toledo, Ohio
6.	Faramarz Nazem	Returned to Teheran, Iran
7.	William Culver Pontius	Union Oil Co. of Calif., Santa Fe Springs, Calif.
8.	James William Sebert	Naval Ordnance Station, Indian Head, Maryland
9.	Allan Wesley Strong	G. E. Pitney Glass Plant, Cleveland, Ohio
10.	Joseph Eugene Suhrie	Standard Oil of Calif., San Francisco, Calif.
11.	Joseph Louis Taraba	Chemical Engineering Dept., Ohio State Universit[y]
		August, 1968
1.	Geoffrey Andrew Lindsay	B.F. Goodrich, Brecksville, Ohio
2.	Paul Richard Michl	U.S. Patent Office, Washington, D.C.
3.	Herbert Alfred Newhouse	Humble Oil and Refining, Houston, Texas
4.	Dudly Kenneth Reese	American Oil, Whiting, Indiana
5.	John Michael Salladay	Dow Chemical Co., Midland, Michigan
6.	Douglas Erwin Smith	PPG, Beaumont, Texas
7.	David John Walters	E. I. Du Pont De Nemours, Berrard, N. Carolina
		December, 1968
1.	William Edward Ferguson	E. I. du Pont de Nemours, La Porte, Texas
2.	James M. Flerchinger	Union Carbide Corp, Carbon Products Div., Parma, O
3.	Lawrence H. Green	begins graduate school for his MBA degree
4.	Modupeola Oluremilekun Owotomo	Will work in Nigeria

MASTER OF SCIENCE

NO.	NAME	COMPANY AND LOCATION
		June, 1968
1.	Ahmet Zeki Kutlu	Phillips Petroleum, Bartlesville, Oklahoma
2.	John Martin Yacher	Public Health Service, Cincinnati, Ohio
		August, 1968
1.	Sung Chun Pak	Chemical Engineering Dept. Ohio State University
2.	Ronald Richard Remick	Sinclair Research, Inc. Harvey, Illinois
		December, 1968
1.	Neil Kenneth Goldwein	Esso Research & Engineering, Florham Park, N. J.
2.	Edward Martin Halko	Diamond Shamrock, Cleveland, Ohio
3.	Richard Frank Havlice	American Oil of Indiana, Whiting, Indiana
4.	Geoffrey Andrew Lindsay	B.F. Goodrich, Brecksville, Ohio
5.	David LeRoy Lull	Diamond Shamrock, Cleveland, Ohio

PLACEMENT OF CHEMICAL ENGINEERING GRADUATES (CONTINUED)

6. Arun Vasant Mandlekar	Union Oil Co. of California, Nederland, Texas
7. Michael Collins Rominger	Chemical Engineering, Ohio State University
8. John Michael Salladay	Dow Chemical Co., Midland, Michigan
9. James William Sebert	Naval Ordnance Station, Indian Head, Maryland

DOCTOR OF PHILOSOPHY

	June, 1968
1. Jerry Randel Barber	Union Carbide, S. Charleston, West Virginia
2. Douglas Wayne Hissong	Esso Research Lab., Baton Rouge, Louisiana
3. Merrill Loren Minges	U.S. Air Force Materials Lab., Dayton, Ohio
	August, 1968
1. Arthur Wood Thornton	Procter & Gamble Co., Cleveland, Ohio
2. Larry Everett Wing	E. I. Du Pont De Nemours, Circleville, Ohio
	December, 1968
1. Roy Russell Huddleston	Esso Standard, New York, New York
2. Eugene Lawrence Jarrett	Union Carbide Corp., S. Charleston, West Virginia
3. Kenneth Norwood McKelvey	E. I. Du Pont De Nemours, Wilmington, Delaware
4. James Edward Williamson	E. I. Du Pont De Nemours, Wilmington, Delaware

DOCTOR OF PHILOSOPHY

	March, 1969
1. Miss Mamata Dutta	Kanpur University, Kanpur, India

MASTER OF SCIENCE

1. Peter Nevius Bartram	To the U.S. Army
2. Robert Anthony Baxter	Diamond Shamrock
3. Rohin Khera	FMC Corp., Huntington, West Virginia
4. Juan Francisco Kuon	Teaching Asst., Universidad Nacional de Ingenieria Lima, Peru

BACHELOR OF SCIENCE

1. Scott McComb Barrick	going on for Master's degree
2. James Louis Braun	going on for Master's degree

THE MUCH ADO ABOUT NOTHING AND SOMETHING DEPARTMENT

It was my thought that many of you will get a laugh and then become serious of what follows

RETIREMENT

(I do not know the source or author of this jem. It was given to me).
When I was young, my slippers were red-
I could kick up my heels over my head-
When I got older, my slippers were blu-
But I still could dance the whole night through!
Now I am old, and my slippers are black-
I walk to the corner and puff my way back-
How do I know my youth has been spent?
My get-up-and-go has got up and went!
But I really don't mind, as I think with a grin-
Of all the grand places my "get-up" has been.
I get up each morning and dust off my wits-
Pick up the paper and read the Obits-
If I find my name missing, I know I'm not dead-
So I eat a good breakfast and go back to bed!

CARMEN, OHIO

This was given me in 1967 by George Brinton Sr., M.E.-E.E. 1907 on the occasion of his sixtieth anniversary. He dropped into my office with Chet McClintock former director of Laboratory Supply Stores. He brought greetings from his good neighbor Sid (Mr. Chemical Engineering) Kirkpatrick. The fourth verse was written by George Brinton Thomas, Jr.

CARMEN OHIO

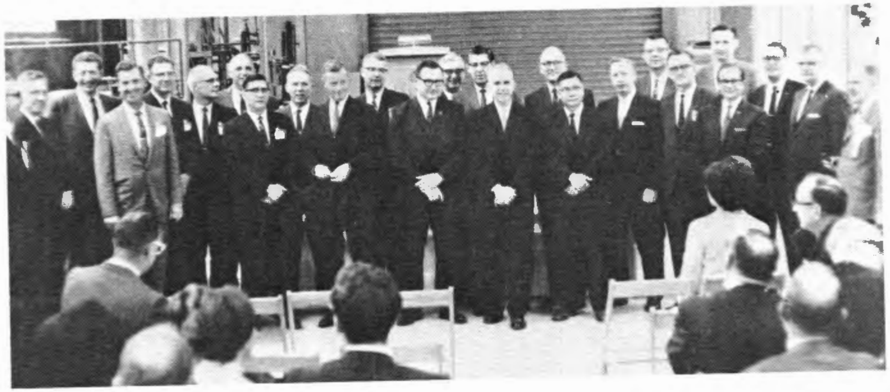
1. Oh! come let's sing O-hi-o's praise,
And songs to Alma Mater raise;
While our hearts rebounding thrill,
With joy which death alone can still.
Summer's heat or Winter's cold,
The seasons pass, the years will roll;
Time and change will surely show
How firm thy friendship - O-hi-o.

2. These jolly days of priceless worth,
By far the gladdest days of earth,
Soon will pass and we not know
How dearly we love O-hi-o.
We should strive to keep thy name
Of fair repute and spotless fame;
So, in college halls we'll grow
To love thee better - O-hi-o.

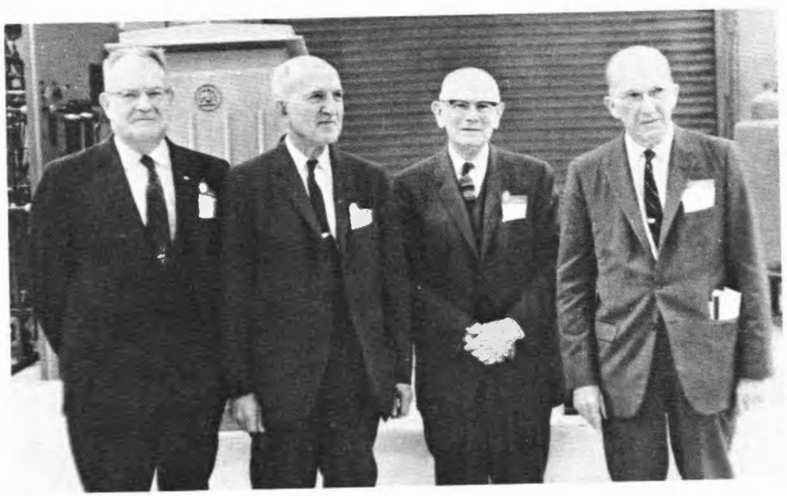
3. Tho' age may dim our mem-ry's store,
We'll think of happy days of yore,
True to friend and frank to foe,
As sturdy sons of O-hi-o.
If on seas of care we roll,
'Neath blackened sky, o'er barren shoal,
Thoughts of thee bid dankness go,
Dear Alma Mater - O-hi-o.

*4. Still we sing Ohio's praise
Our Alma Mater all our days.
Sixty years have come and gone
And still our love for thee lives on.
As the years have swiftly flown
Thy name has ever dearer grown;
Dearer now than long ago
Thou art forever - O-hi-o!

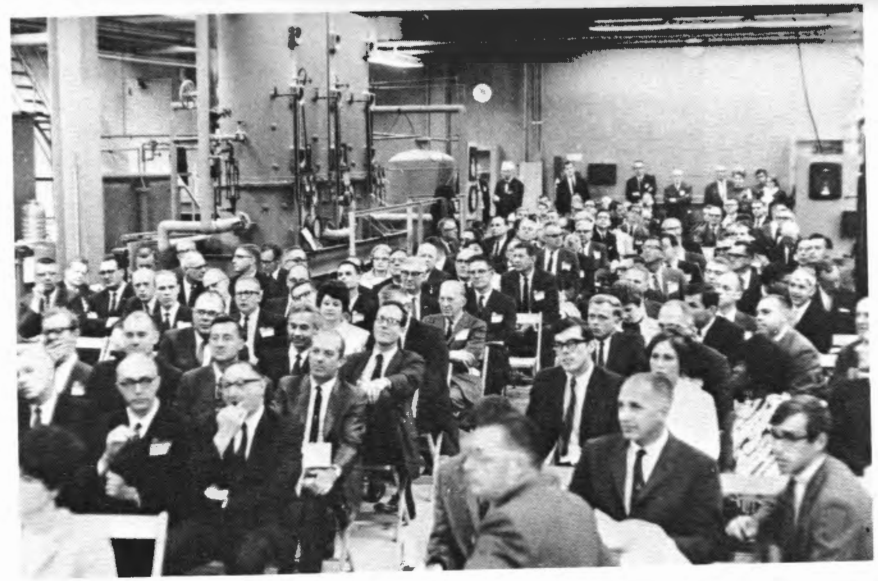
*Written by Geroge Brinton Thomas, Jr., son of George Brinton Thomas, Sr.. ME-EE'07. Comment by Mr. Thomas, Sr.: "Here is a fourth verse for Carmen Ohio - written by son George, Jr., who was raised on Carmen Ohio along with other college and folk songs under the guidance of his musical mother."



1943- R.M.Garrett, P.T.Whitmire, W.C.McConnell, L.Harris, M.D.Cover, J.N.Mendiola, D.F.Haberkost, R.K. Ritzert, V.C.Seguin, B.S.Heintzelman, G.L.Gifford, P.K.Gaulke, E.E.Buxton, H.J.Pierce, D.F.Drake, H.T.Yee, B.D.Inman, T.E.Bieterman, L.C.Beale, A.W.Lemmon, W.Luce, W.D.Thomas, C.E.Boyd, G.V.Wootton

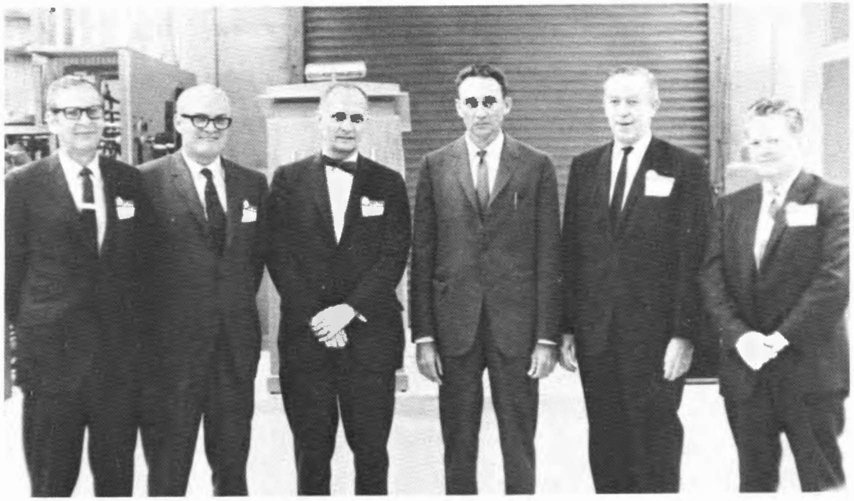


The Sages of the Department
1914, 1918- L.T. Capell, C.A. Buehler, T.A. Boyd, J.P. Smoots



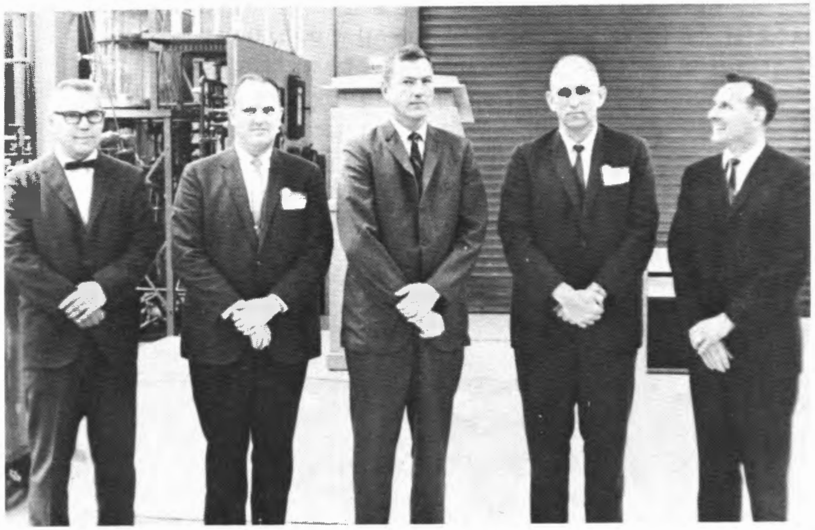
The meeting in the Unit Operations Laboratory

1923- D.C.Butts, E.C.Hendrickson, G.E.Bland, E.Meiter, A.Schwensen



1938- R.S.Radow, R.W.Conaway, G.S.Tobias
C.E.Spencer, H.B.Warner, J.F. Cole

1948- D.E.Darr, N.R.Cox, C.J.Setzer,
J.Wunderle, L.B.Fosdick, J.G.Gerlach,
R.L.Bates, Mrs.J.A.(Herbkersman)
Johnson, H.Robinson, R.A.Arnold,
L.Wallace, M.E.Hattan



1953- R.L.Huntington, L.C.Peoples, R.T.Hewitt,
R.A.Bates (the phantom) W.H.Casto

1933- H.L.Barnebey, L.K.Grove

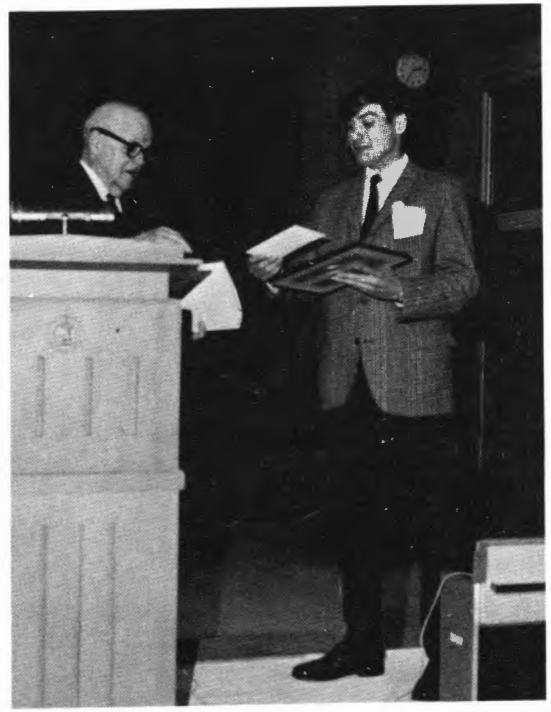
1933- H.L.Barnebey, L.K.Grove

Yaking! Shirley Turner, Betty Frazier

T.R. Loy

N.W. Barnhill

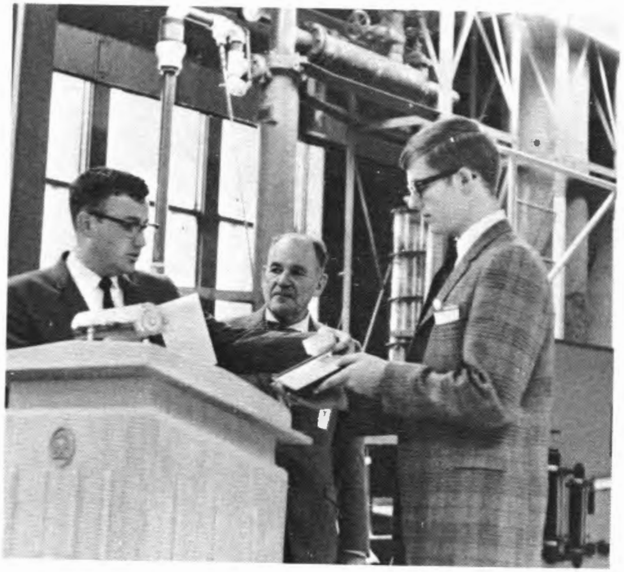
Suzie Q. Dempsey and Tom Fitz



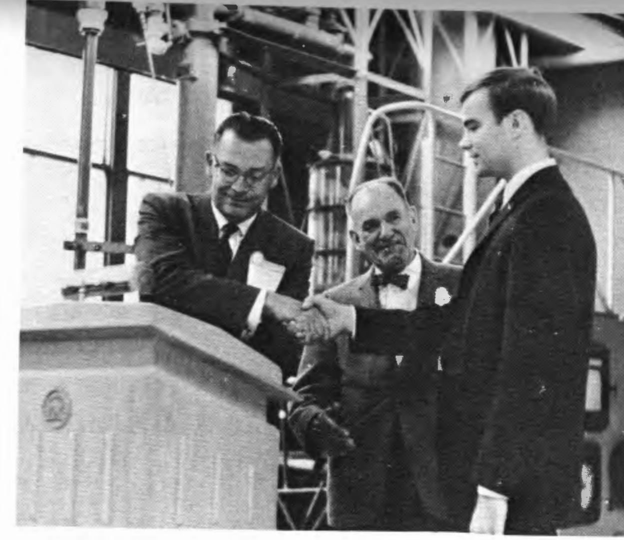
Sidney D.Kirkpatrick (Mr. Chemical Engineering) presenting M.S.Kellogg Co design award to Dick Haberkost

Part of the Union Carbide gang presenting the Propetual Motion Clock to J.H. Koffolt. **Tom Koffolt, JHK, E.E.Bucksten; 2nd row:** Norm Cox, Dr.Bill Larcamp, W.H. Casto, Burt Heitzleman, last row; R.T.Huent, M.L.McClennan, Ed Cannon, H.Robertson

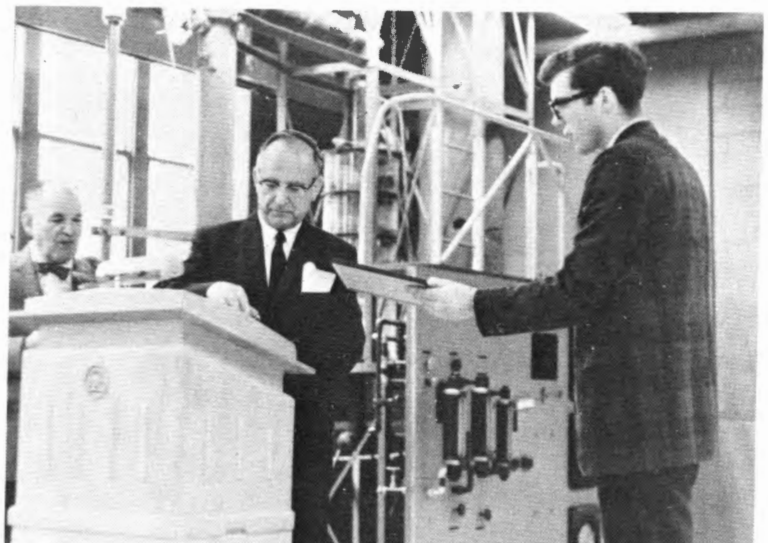
All Haberkosts, Don, expected 1970, Dean, 1943 and Dick, 1968



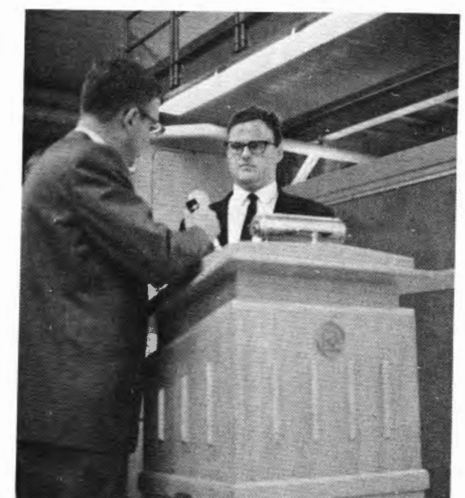
Paul Brown presenting the AIChE scholarship award to Bradford Dunn



Dr. Syverson presenting Doug E. Smith with the department of Chemical Engineering student department service award



Dr. W. B. Kay presenting David J. Walters with the American Institute of Chemists Award



Returning to Jim Sebert the scholarship award of 1965

Paul Brown presenting to John M. Salladay and William Ferguson the AIChE National Student Contest Problem Award

Hooping it up!

Some more hooping!!

Some of our beautiful lady jewels

APPENDIX V

✓

April 17, 1969

THE OHIO STATE UNIVERSITY

CHEMICAL ENGINEERING RESEARCH COURSES PROJECT PROBLEMS

MINOR PROBLEMS AND DISSERTATIONS

Chemical Engineering 763 - 785 - 801 - 999

ASSIGNMENT OF AN ADVISER

1. Each student working toward a graduate degree or who will begin work on a project problem will be assigened a faculty adviser by the time he is ready to begin research work.

The following staff members are available for assignment as advisers:

			PHONE #
1.	Robert S. Brodkey	Rm. 321C Chemical Engineering Bldg.	293-2609
2.	Edward J. Freeh	Rm. 333A Chemical Engineering Bldg.	293-2508
3.	Christie J. Geankoplis	Rm. 333B Chemical Engineering Bldg.	293-2508
4.	E. H. Haering	Rm. 335B Chemical Engineering Bldg.	293-2698
5.	Harry C. Hershey	Rm. 321B Chemical Engineering Bldg.	293-2609
6.	Webster B. Kay	Rm. 435B Chemical Engineering Bldg.	293-2727
7.	Joseph H. Koffolt	Rm. 125 Chemical Engineering Bldg.	293-6591
8.	R. E. Lynn	Rm. 421B Chemical Engineering Bldg.	293-7907
9.	Waldron D. Sheets	Water Resources Center, 1791 Neil	293-6716
10.	H. C. Slider	Rm. 335A Chemical Engineering Bldg.	293-2698
11.	Edwin E. Smith	Rm 221E Chemical Engineering Bldg.	293-2408
12.	Karlis Svanks	Rm 221D Chemical Engineering Bldg.	293-2408
13.	Thomas L. Sweeney	Rm. 435A Chemical Engineering Bldg.	293-2727
14.	Aldrich Syverson	Rm. 121B Chemical Engineering Bldg.	293-6986

NOTE

1. On the attached sheets are research topics of various members of the Department and the Research Professors who are located in the Engineering Experiment Station

2. The Department will also consider problems suggested by a student; however, these must be supervised by a departmental staff member.

3. The Department will also consider a research problem under the supervision of a committee consisting of members for the Chemical Engineering Department and other departments. The chairman must be from the Chemical Engineering Dept. Petitions concerning these must be discussed frist with the undersigned

4. Read the topics given on the attached pages in detail. Arrange for an interview with instructors in charge of problems you are interested in.

5. After these conferences and after you have decided upon the project or projects you are interested in, kindly fill out the Adviser Request form and turn in to the Chemical Engineering Office, Rm. 121, within the prescribed time limit.

6. The Graduate Committee of the Department will meet as soon as practical and assignments of advisers will be announced soon thereafter.

Aldrich Syverson, Chairman

RESEARCH TOPICS - Robert S. Brodkey
Room 321C
293-2609

I. Non-Newtonian Systems: This area considers the deviations of materials from Newtonian behavior and uses a kinetic interpretation of such flow. There is one master's problem on the analysis of existing literature data in terms of this theory. The analysis and measurement of normal stresses is an important doctoral problem still to be solved. Finally, there is a master's problem on the adaptation of the kinetic approach to a dynamic model of a plastic screw extruder.

II. Turbulence, Mixing, and Kinetics: The velocity field in various stirred tank mixing vessels is available for master's study. A doctoral study co-sponsored by Dr. H. C. Hershey is the laminar-turbulent transition in pipe flow systems by means of a visual photographic technique is also available. There is also a master's problem on the analysis of existing literature data by means of mixing theory.

III. Two-phase flow: One master's problem is available on the determination of the pressure drop and geometry in annular two-phase horizontal and vertical flow. The problem involves a complex stepwise computer solution.

IV. Bio-medical Research: There now exists an interest in this area and although specific problems have not been formulated, it might be possible to find a problem of mutual interest in this area.

V. The Lake and Atmosphere Problem: Like the forgoing subject area there is now an interest in problems of Lake Erie and problems of global weather analysis. Again no specific problems are in mind, but it might be possible to find a problem of mutual interest in these areas.

RESEARCH TOPICS - E. J. Freeh

Room 333A

293-2508

A major area of interest is the application of digital, analog, and hybrid computers to practical problems arising in the field of chemical engineering. Applications generally involve the first two areas listed below and may involve all four.

I. Modeling:

Modeling involves the development of quantitative relationships among measurable quantities in a physical system. The objective is to satisfactorily explain observed phenomena in terms of basic engineering principles. Three suggestions follow; however, most any process, industrial or laboratory, is a potential candidate for a modeling study.

a. Determination of the dynamics of a fixed-bed reactor,
b. Dynamic behavior of a back-mixed crystallizer, and
c. Development of a dynamic model for a plasticating extruder.

II. Simulation:

Simulation concerns the use of a model to study a system, generally with the aid of a computer. The research effort may, for example, be directed toward gaining further knowledge about the steady state and/or dynamic behavior of a particular system or class of systems, or it may be directed toward the development of new simulation techniques.

III. Applied research in process control centers about the digital computer because of both its increasing importance as a control device and the fact that most problems of a practical nature involve digital or hybrid simulation. Research problems might involve feedback control, feedforward control, predictive control, adaptive control, samples data systems, multi-variable control, etc.

IV. Process Design:

Computers have much to contribute to the field of process design, yet their use in design is not widespread. Development of new computer-based methods, especially the adaptation of simulation and optimization techniques to process design, will increase computer effectiveness. Research is also needed on the application of newer techniques such as signal flow graphs and boolean matrices to permit easy interfacing of specific problems with generalized programs.

RESEARCH TOPICS - C. J. Geankoplis

Room 333B

293-2508

<u>RESEARCH PROBLEMS IN MASS TRANSFER, DIFFUSION, DIFFUSION AND REACTION</u>

<u>Ph.D AND M.S. TOPICS</u>

1. <u>Axial Dispersion in Packed Beds by Frequency Response</u>

    a. Use sine waves or pulse to obtain dispersion of liquids in packed beds or porous solids of known geometry.
    b. Use glass beads with dead-end holes to simulate a capacitance system.
    c. Study porous spheres with adsorption to see effect on dispersion.
    d. Derive equations for physical models of adsorption + capacitance + mass transfer, chemical reaction, etc. solve by computers.
    e. Study region of molecular diffusion at very low flow rates.

2. <u>Knudsen and Molecular Diffusion of Gases in Pores over Large Pressure Ranges</u>

    a. Measure diffusion of binary gases at high vacuum to 1 atm. in capillary tubes to test theoretical equation for transition region.
    b. Determine diffusion of 2 gases at vac. to 1 atm. in porous solids of alumina, porous metals, and solids of known structures of 2 or 3 peaks.
    c. Construct apparatus for high pressures to 600 PSI and determine diffusion of gases in capillaries and porous solids.
    d. Measure diffusion of multicomponent gases N_2, H_e, A_r at 1 atm.
    e. Derive theoretical equations for multicomponent gases in transition region. Solve various cases on computer.
    f. Use step-response to measure axial dispersion in porous solids.
    g. Study forced flow + diffusion in capillary and porous solids to test theoretical equations using different total pressures.
    h. Measure forced flow + diffusion in porous solids when absorbed layer flow occurs.

3. <u>Mass Transfer of Liquids to Flat Plate of Known Geometry</u>

    a. Study mass transfer of liquid to flat plate of benzoic acid with and without chemical reaction at low and high velocities. Derive equations.
    b. Obtain the effects of varying the viscosity and Schmidt number widely by using sucrose-water or ethylene glycol-H_2O. Vary the solid.
    c. Study the effects of very high flux vectors by using an NaOH plate. Derive equations and solve on computer.
    d. Obtain data for turbulent diffusion and a solution of suspended solids. Vary the Schmidt number and viscosity.
    e. Use non-Newtonian fluids and study mass transfer and pulse flow or ultrasonic vibrations in the fluid.

4. <u>Multicomponent Molecular Diffusion Coefficients for Gases</u>

   a. Use a capillary with a low or high molecular weight liquid in it or a polar liquid and measure its molecular diffusion coefficient in a stream of H_e, CO_2, or N_2 and in a mixture of them.
   b. Derive equations for multicomponent diffusion and solve special cases by computer.

M.S. TOPICS

1. <u>Molecular Diffusion of Liquids in Porous Solids</u>

   Obtain diffusion data of liquids in porous solids and compare with the random-pore model theory.

2, <u>Mass Transfer to Packed Beds</u>

   Study mass transfer of Liquids to bed of benzoic acid spheres. Vary the driving force. Study sphere in inert bed. Obtain data for mass transfer and chemical reaction and derive the theory.

3. <u>Molecular Diffusion Coefficients of Liquids</u>

   a. Determine molecular diffusion coefficients of 3 components in a liquid using a diffusion cell. Compare with theory.
   b. Measure the diffusion coefficient of a solute in water, of a large molecular weight solute in organic solvents, of solutes in Hg.
   c. Obtain the diffusion coefficient of a dilute solute in binary solvents. Derive theoretical equations.
   d. Study mass transfer in laminar flow of a solution of fine particles in Brownian movement flowing over a flat plate of benzoic acid. The particles adsorb acid and augment the diffusion (similar to oxygen transfer of hemoglobin in blood.)

4. <u>Axial Dispersion in Extraction Towers</u>

   Study axial mixing in spray extraction towers. Obtain internal dispersion coefficients inside the tower. Derive equations to correct extraction data for dispersion effects.

RESEARCH TOPICS - Edwin R. Haering

Room 335B

293-2698

I. Multicomponent Absorption Studies

(a) Experimental Investigation of Gluekauf's Theory

(b) Determination of the Effect of the Order of Admission of Gases on Quantity of Adsorbate Adsorbed.

(c) Correlation of Mixed Adsorption Isotherms

II. Adsorption Studies

(a) Applicability of Polanyi Potential Theory

(b) Determination and Correlation of Rates of Adsorption

(c) Determination of Pure Component Isotherms on Selected Systems

III. Kinetics and Catalysis

(a) Use of DTA for Catalyst Evaluation

(b) Fixed Bed Studies on Selected Reactions

(c) Design and Evaluation of Fluidized Bed Catalytic Reactor

(d) Evaluation of Series of Continuous Stirred Tank Reactors

(e) Design and Evaluation of Experimental Fixed Bed Reactor

IV. Chemical Engineering Operations

(a) Design and Evaluation of Bench-scale Thickner

RESEARCH TOPICS - Harry C. Hershey

Room 321B

293-2609

A. Drag Reduction

1. Use of photographic techniques to analyze differences in the boundary layers of drag reducing and non-drag reducing solutions.

2. Measurement of velocity profiles in the viscous sublayer.

3. The turbulent flow characteristics of non-aqueous soap solutions will be investigated. This investigation will concentrate on defining what molecular structure is most successful in reducing drag and on determining what solution properties, such as size, shape, and concentration of micelles, are important in correlating turbulent friction factor data.

B. Fluid Mechanics

1. A study of the laminar-turbulent transition.

C. Applied Mathematics

1. Numerical solution of partial differential equations as applied to the mathematical modeling of turbulent flow.

RESEARCH TOPICS - W. B. Kay

Room 435B

293-2727

1. Measurements of change in volume on mixing of polar and nonpolar compounds.

2. Heats of Mixing (using Bunsen Calarimeter)

3. Determination of Virial coefficients of gases and vapors at low pressure.

4. Vapor liquid equilibrium relations in binary system near atmospheric pressure. Correlations of data. Calculation of excess free energies.

5. Effect of pressure on the mutual solubility of partially miscible liquids.

6. Critical constants of inorganic compounds.

7. Vapor pressure and density of pure substances.

8. Critical constants of hydrocarbon mixtures.

RESEARCH TOPICS - Joseph H. Koffolt

Room 125

293-6591

Master's Thesis

<u>EXTRACTIVE DISTILLATION</u> - The effect of a member of the same homologous on the Activity Coefficient or Vapor-liquid Equilibrium Relationships.

<u>EXTRACTIVE DISTILLATION</u> - Design, Construction, and Operating Characteristics of an Extractive Distillation Unit.

RESEARCH TOPICS - R. E. Lynn
Room 421B
293-7907

The following are suggested areas for research in polymer engineering and are not intended to be specific topics.

I. Monomer Research

Synthesis and purification of specialty monomers that may be required in polymerization research that are not available from commercial sources.

II. Polymerization Research

1. Kinetics and mechanism of high-pressure polymerization.
2. Reactor Engineering Research
   a. Influence of reactor configuration on the nature of polymer particles.
   b. Conceptual studies for very rapid polymerizations
   c. Nature and mechanism of polymer deposition (reactor fouling) during polymerization
   d. Molecular weight distribution and control in multi-stage reactors

III. Polymer Recovery

1. Mass transfer studies of fluids within polymer particles.
2. Mechanism of agglomeration and coagulation.

IV. Polymer Processing

1. Mathematical modelling of processing equipment
2. Computer control of processing equipment

RESEARCH TOPICS - W. D. Sheets

Room 106 - Water Resources Center

1791 Neil Ave.

293-6716

1. Development of a New Index for Measuring the Efficiency of the Activated Sludge Process.

2. Mass Culturing of Algae.

3. Protein Production from Algae.

4. Titanium Dioxide Recovery from Paper Mill White Water.

5. The Inlluence of the "Velocity Gradient" on the Effectiveness of Coagulation.

6. Toxicity of Aluminum Sulfate.

RESEARCH TOPICS - H. C. Slider

Room 335A

293-2698

The reservoir engineering problems associated with oil and gas production from underground sands and limestones presents very interesting applications of chemical engineering principles in the fields of fluid flow in a porous media, material balance, phase behavior, and fluid displacements in a porous media. Student financial assistance for research may be available for both regular graduate students and combined students. Equipment stipends are also normally available for these projects. Ph.D. candidates will have co-advisors, possibly Dr. Brodkey in the area of fluid flow or Dr. Kay in the area of phase behavior.

Miscible Displacement Studies: A subsurface petroleum reservoir that moves oil to the well by gas liberated from oil as the reservoir pressure declines results in a very low fractional recovery of the oil in the reservoir. This recovery may ultimately be only 15% of the oil in the reservoir. By injecting water in one well and producing oil from adjoining wells we may recover as much as 50% of the oil.

If an economical displacing phase can be found that is miscible with the reservoir oil, recovery could approach 100%. At the present time no good theoretical procedure has been devised to predict miscibility. One of the objectives of this study is then to design a practical theoretical method of predicting miscibility of a crude oil and some mixture of methane and the other lighter hydrocarbon such as ethane, propane, and possibly butane. This solution will probably take the form of a digital computer calculation of phase behavior using published equilibrium constants.

The solution would be tested by performing laboratory displacements of actual crude oil and its dissolved gas in sand cores at reservoir pressures and temperatures. This equipment has been assembled and used previously in miscible displacement studies.

Complete solution of the problem will require an analysis of the miscible displacement process. For immiscible displacement we know that:

$$\left.\frac{\partial X}{\partial t}\right|_{s_{dj}} = \bar{v} \left.\frac{\partial f_d}{\partial S_d}\right|_{s_{dj}}$$

where X = distances along displacement

t = time

$\bar{v}_p$ = average pore velocity

f_d = fraction of displacing fluid flowing

S_d = Displacing fluid saturation

S_{dj} = A particular S_d value

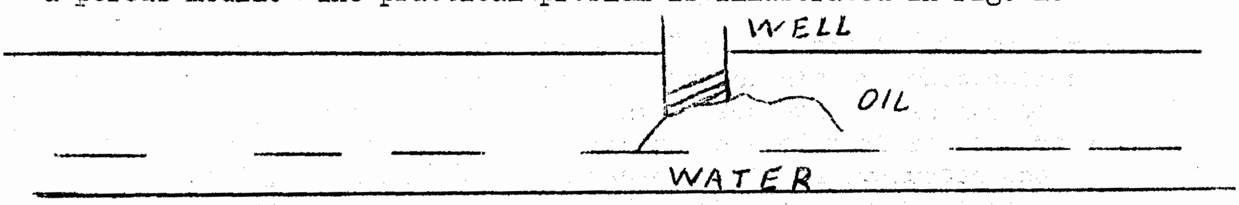
However, a practical understanding of miscible displacement in natural reservoirs is completely unknown. Russ Huddleston, recent Ph.D. recipient initiated the fluid displacement phase of the investigation. The background technology and Russ' progress on the problem are discussed in the September, 1966 issue of News in Engineering in an article "Miscible Displacement of Oil". If you have not been furnished a copy of this article it can be obtained from Professor Slider.

Russ' work will have to be extended in many different directions. He was working with the simplest case of matched viscosities and densities for the displaced and displacing fluids. To be of practical use this work will have to be extended to include different density and viscosity ratios since matched values do not occur in a practical reservoir displacement.

No previous P.E. Course work is necessary since this investigation is based on chemical engineering principles.

Gas and Water Coning Studies:

It is anticipated that these would be principally digital computer type investigations. The problem is one of 2 dimensional fluid flow in a porous media. The practical problem is illustrated in Fig. 1.



Oil in porous rocks is often underlain by water which advances as the oil is produced and "efficiently" displaces the oil from the porous media. However, there is a tendency for the water to "come" into the producing well as shown by the solid line which hampers the normal advance of the water and decreases the displacement efficiency. The problem is to find the rate of flow and time necessary for the development of the cone. One dimension, simple steady state and single fluid unsteady state fluid flow equations are available but since our problem is two dimensional (radial and vertical) the equation must be applied by numerical methods. Bill Deerhake initiated this study for his M.S. He devised a numerical method that used an alternating direction implicit procedure and proved its applicability by applying it to an unsteady state compressible fluid model. This may mean that the calculating procedure can be applied to a coning model. This would require adopting the precedure to two dimensional flow and two phase flow.

The above represents two examples of areas of research available in the reservoir engineering field. Professor Slider can outline many additional possibilities for laboratory and computer type of investigations for those who are interested. Other research ideas can be obtained from the magazine Petroleum Technology, of which you were recently supplied a copy.

RESEARCH TOPICS - Edwin E. Smith

Room 221E

293-2408

1. Sulfide-to-Sulfate Reaction Mechanism:

Physical, chemical, and microbiological factors are being considered in an investigation to determine the rate-determining steps in the oxidation of pyrite under "natural" conditions. Three general pyritic systems are currently under study:

A. Laboratory system using concentrated iron disulfides--study of chemical kinetics and mechanism.
B. Underground mine systems--to evaluate physical and microbiological effects on rate of acid discharge from the system.
C. Refuse (Gob) pile systems--to evaluate rate-determining factors and methods of inhibiting reaction.

2. Defining and Determining "Combustibility":

A more basic definition of "combustibility" is required for determining the contribution materials of construction and furnishings make to the initiation and sustenance of fires. Equipment for determining rate of heat release as a function of a number of variables is to be evaluated and data obtained is to be related to the basic definition developed.

3. Nuclear Research:

A. Use of radioactive tracers to follow ground water flows.
B. Aqueous phase adsorption studies using radioisotopes
C. Use of radioactive tracers to elucidate reaction mechanism.

RESEARCH TOPICS - K. Svanks

Room 221D

293-2408

SOLID FUELS

1. Determination of equilibrium moisture of Ohio coals as a function of environmental partial pressure of water vapor.

2. Elimination of sulfur from Ohio coals by carbonization and reusing the carbonization products for production of low sulfur coke of uniform size. Purpose: To develop marketable products from Ohio coals (high sulfur content) considering future requirements for low sulfur solid fuels to eliminate air polution.

3. Development of new/or improved analytical methods for coal and tests for coal rank determination in close cooperation with ASTM and documents available by ISO (International Organization for Standardization).

WATER POLLUTION

1. Precipitation of phosphates from water with ferrous compounds: mechanixm and kinetics.

2. Application of commercially-available materials and development of new nucleation, flotation and surface active agents for precipitation of phosphates from water.

3. Methods of removing the insoluble phosphates and polyphosphates formed in the reaction with particular emphasis on flotation processes.

4. The reduction of total nitrogen and BOD of water concurrently with phosphates removed by coprecipitation and/or adsorption on the phosphate precipitate with or without specific floculation agents.

ADSORPTION

1. Kinetics and mechanism of adsorption on surface active and porous adsorbents from aqueous solutions, particularly in the region of multimolecular layer of adsorbents.

2. Flow of adsorbed gases through porous media, mechanism and predictability (mathematical approach). This topic is limited to availability of required equipment.

RESEARCH TOPICS - T. L. Sweeney

Room 435A

293-2727

Areas of Interest

1. Heat and Mass Transfer

2. Small Particle Systems

3. Air Pollution Control Devices

Typical Problems (Completed or in Progress) for graduate or senior research projects

1. A study of the collection of micron-size particle by supported drops

2. A study of the collection of micron-size particles by falling drops

3. Preparation of a general purpose heat conduction program suitable for instructional purposes

4. Comparison of implicit and explicit formulations of the heat conduction equation using a digital computer

5. Thermal conductivity of fibrous silica insulation to 2700°F

6. Mass transfer from rectangular cavities - a feasibility study

7. Mass transfer from rectangular cavities

8. Mass transfer and flow patterns in rectangular cavities

9. The effect of physical properties on the shattering velocity of liquid drops

10. Heat transfer with melting

11. Contact heat transfer

RESEARCH TOPICS - A. Syverson

Room 121B

293-6986

<u>General Topics for Research for Ph.D., M.Sc., and B.Ch.E. Projects</u>

1. Adsorption of gases on solids

   a. Studies on Kinetics and equilibrium measurements for adsorption of gases on porous solids.

   b. Adsorption of mixtures of gases on porous solids.

   c. Studies on the contribution of adsorbed layer flow to the transport in microporous solids.

2. Heterogeneous catalysis

   a. Investigation of the role of adsorption in heterogeneous catalysis by means of rapid transient studies at normal reaction conditions.

   b. Fixed bed reactor studies on several systems such as the dehydration of alcohols, dehydrohalogenation, dehydrogenation, etc.

   c. New rapid analytical devices for kinetics research.

3. Electrochemical engineering-Electrodics

   a. Investigation of electrochemical principles or devices that could be useful in surface reaction kinetics studies.

APPENDIX VI

CLASSIFICATION OF
CHEMICAL ENGINEERING ALUMNI
1906 - 1958
THE OHIO STATE UNIVERSITY

Joseph H. Koffolt

THE OHIO STATE UNIVERSITY
DEPARTMENT OF CHEMICAL ENGINEERING

Mr. Harry Warner
Vice President Development
B.F. Goodrich Chemical Company
3135 Euclid Avenue
Cleveland 15, Ohio

Dr. Melvin DeGroote
Vice President
Tretolite Company
369 Marshall Avenue
St. Louis, Missouri

July 27, 1958

Dear Harry and Melvin:

Attached herewith is the "Domesday Book of Chemical Engineering"* or the Classification of the some one thousand nine hundred and eighteen (1918) Chemical Engineering Alumni from 1908 to 1958. During this time 2293 degrees have been awarded. These are on the Bachelors, Masters, Professional and Doctoral level.

The table of contents given on the next page gives a summary of the various items contained in this report and how the alumni were classified by industry or work function.

It is interesting to point out that there are five hundred and thirty two (532) companies, business' etc, in which our chemical engineers are participants. The big ten with the number of O.S.U. chemical engineering alumni in each are:

1.	E. I. DuPont de Nemours and Co.	106	6.	Battelle Memorial Institute......	38
2.	Union Carbide Corporation..........	72	7.	Columbia Southern Chemical Corp..	29
3.	Universities and Teaching..........	55	8.	General Electric Company.........	27
4.	B.F. Goodrich Company..............	46	9.	General Motors Corporation.......	26
5.	Goodyear Tire and Rubber Co........	43	10.	Olin-Mathieson Chemical Corp.....	26

As both of you know this is a "Crash Report". Thousands of man and women hours went into this Herculean task which was started last April. Although I have checked and rechecked this listing many times over, I am sure that it is not perfect or without error. We put a diligent and concentrated effort in keeping our alumni file up-to-date. However, we are not always informed when our alumni make a move. I do believe that our alumni file is perhaps one of the best in the country.

Our office staff are to be commended for their perserverance in compiling this list. Mrs. Carolyn Bennett and Miss Mary Sampson had the patience of Job throughout this tedious compilation. Mrs. Hatzer assisted in some of the early work.

I am looking forward to seeing Harry on August 5th, in Cleveland.

With kindest personal regards.

Sincerely yours,

Joseph H. Koffolt, Chairman
Chemical Engineering Department

*Twelve years after the Battle of Hastings William the Conqueror ended up his speech to the Wianagemot (King's Council) with these words "By the splendor of God! We must know all about this land and what it contains. Today we know nothing". What follows on the next 85 pages is our "Domesday Book" or what we know about our "Jewels"!

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4. Pulp, Paper, Containers and Related 58
5. Paint, Lacquer, Pigments, Varnish, and Related 59
6. Fire Underwriters, Inspection Bureaus, Insurance 59
7. Food, Starch, Agricultural and Related 59
8. The Glass Industry 59
9. Metallurgical Industries 60
10. Ceramic, Lime, Construction Materials and Related 60
11. Automotive Industry 60
12. Equipment and Instrument Companies 60
13. Chemical Construction Companies 60
14. Pharmaceuticals and Related 61
15. Research Institutes 61
16. Water, Sewage and Municipalities 61
17. Utilities, Gas, Electric and Steam Power Plant 61
18. State of Ohio, Department of Health, Highway, etc. 61
19. Electrical Companies 61
20. Patent Attorneys - Private 61
21. Federal Government, Army, Navy, Bureau of Mines, Wright Field etc. 62
22. Miscellaneous Non-Chemical Companies 62
23. Editorial, Chemical Abstracts, Engineering Alloys 62
24. Aviation and Related 62
25. Consulting, Technical Labs., Independent Chemical Business etc... 62
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XII. ALPHABETICAL INDEX OF COMPANIES EMPLOYING OHIO STATE CHEMICAL ENGINEERS

SUMMARY OF OHIO CHEMICAL ENGINEERS CLASSIFIED BY INDUSTRIES OR WORK FUNCTION

Specific data for these are given on pages 57 to 62 of this report. The some 531 companies listed on pages 1 to 56 are classified according to industry or work function. It is recognized that other classifications are possible. For example, The B. F. Goodrich Company, which has many activities as chemicals, tires, plastics, etc., could have been in as many classifications that there are divisions of the company. This would have defeated the purpose of this report as we are interested in how many men have gone with the Goodrich, DuPont, Union Carbide, etc., organization. Therefore, B. F. Goodrich was classified as a chemical company and not into its many departments as chemicals, pigments, nuclear, textiles, paints, etc. What follows is the summary.

		NUMBER OF OSU CHEMICAL ENGINEERS	%
1.	Chemical Companies	600	36.48
2.	Petroleum, Petro-Chemicals, and Related Industries	177	10.76
3.	Rubber and Chemical Companies	143	8.69
4.	Teaching at Universities, High Schools, and Foreign Univ.	85	5.17
5.	Federal Government (Army, Navy, Wright Field, Bureau of Mines, Bureau of Standards, etc.)	70	4.26
6.	The Metallurgical Industries, Coal-Coke Chemicals and Related Ind.	67	4.10
7.	Research Institutes	54	3.28
8.	Pulp, Paper, Containers and Related Industries	45	2.73
9.	Electrical Companies	42	2.55
10.	Paint, Lacquer, Pigment, Varnish and Related Industries	35	2.13
11.	Equipment and Instrument Companies	29	1.76
12.	Automotive and Related Industries	28	1.70
13.	Ceramic, Lime, and Construction Materials and Related Industries	27	1.64
14.	The Glass Industry and Related Industries	24	1.45
15.	Fire Underwriters, Inspection Bureaus, Insurance and Related Industries	23	1.40
16.	Food, Starch, Salt and other Agricultural and Related Products	22	1.34
17.	Pharmaceutical and Related Industries.	22	1.34
18.	Aviation and Related Industries	22	1.34
19.	Miscellaneous Non-Chemical Companies as Stoves, Shoe Machinery, Cable, etc.	19	1.16
20.	Chemical Construction Companies	12	0.70
21.	Consulting Engineers, Technical Labs, and Own Business	11	0.67
22.	Water Sewage and Municipalities	10	0.61
23.	State of Ohio (Dept. of Health, Highway and Ind. Hygiene)	10	0.61
24.	Utilities (Gas, Electric, Power)	6	0.37
25.	Independent Patent Attorneys	3	0.18
26.	Technical Publications, (Chemical Abstracts, Engineering Alloys, etc.)	3	0.18
27.	Miscellaneous Non-Chemical Companies as Jewelry, Rugs, Real Estate, Grocery, Physicians, Finance Companies, Taverns, Motels, Gift Shops, etc.	56	3.4
	TOTAL	1645	100.00

Deceased Alumni	116
Lost Alumni (No Address)	90
Lost Alumni (Possible Address)	41
Foreign Alumni (most of them in Communist China)	26
GRAND TOTAL	1918

LIST OF COMPANIES HAVING THREE OR MORE OHIO STATE CHEMICAL ENGINEERS

LISTED IN ORDER OF NUMBER

NAME OF COMPANY	NO. OF OSU CHEMICAL ENGINEERS	NAME OF COMPANY	NO. OF OSU CHEMICAL ENGINEERS
E.I.DuPONT DE NEMOURS AND CO.	106	PURE OIL COMPANY	6
UNION CARBIDE CORPORATION	72	UNION OIL OF CALIFORNIA	6
UNIVERSITIES	55	WEST VIRGINIA PULP AND PAPER	6
B.F. GOODRICH COMPANY	46	AIR FORCE	5
GOODYEAR TIRE AND RUBBER CO.	43	ATLANTIC REFINERY	5
BATTELLE MEMORIAL INSTITUTE	38	CHEMSTRAND CORPORATION	5
COLUMBIA-SOUTHERN CHEMICAL CORP.	29	DAYTON RUBBER COMPANY	5
GENERAL ELECTRIC COMPANY	27	HERCULES POWDER COMPANY	5
GENERAL MOTORS CORPORATION	26	LIBBEY-OWENS-FORD GLASS COMPANY	5
OLIN MATHIESON CHEMICAL COMPANY	26	SUN OIL COMPANY	5
SHELL OIL COMPANY AND CHEMICAL	21	U. S. GYPSUM	5
EASTMAN KODAK COMPANY	20	ASHLAND OIL COMPANY	4
STANDARD OIL OF INDIANA	20	U. S. BUREAU OF MINES	4
STANDARD OIL COMPANY OF NEW JERSEY	19	GENERAL ANILINE AND FILM CO.(ANSCO)	4
MONSANTO CHEMICAL COMPANY	19	W. R. GRACE COMPANY	4
DOW CHEMICAL COMPANY	18	HAGAN CORPORATION	4
ARMY	18	NESTIES(Western Hemisphere Research)	6
FIRESTONE TIRE AND RUBBER CO.	17	SHERWIN WILLIAMS	4
U. S. STEEL CORPORATION	16	AMERICAN OIL COMPANY	3
FEDERAL GOVERNMENT	16	AMERICAN POTASH AND CHEMICAL CO.	3
AMERICAN CYANAMID COMPANY	16	AMERICAN CAN COMPANY	3
PROCTOR AND GAMBLE	16	BABCOCK-WILCOX	3
ALLIED CHEMICAL AND DYE CORP.	15	C. F. BRAUN COMPANY	3
KOPPERS COMPANY	15	CHAMPION PAPER AND FIBER	3
MEAD CORPORATION	13	HARSHAW CHEMICAL COMPANY	3
U.S.A.F. AIR RESEARCH AND DEVEL.	13	INTERLAKE IRON CORPORATION	3
SOHIO OIL AND SOHIO CHEMICAL	13	~~INDUSTRIAL NUCLEONICS~~	3
DIAMOND ALKALI	12	OHIO OIL COMPANY	3
SOCONY MOBIL AND SOCONY VACUUM OIL	12	OHIO DEPARTMENT OF HEALTH	3
REPUBLIC STEEL CORPORATION	11	OHIO INSPECTION BUREAU	3
NAVY	10	SINCLAIR OIL RESEARCH LABS.	3
PARKE-DAVIS	10	SYLVANIA ELECTRIC PRODUCTS	3
TEACHERS, HIGH SCHOOL	10	TEXAS (OIL) COMPANY	3
ATOMIC ENERGY COMMISSION	9	TIMKEN ROLLER BEARING	3
STATE OF OHIO	9	THIOKOL CORPORATION	3
WATER, SEWAGE AND MUNICIPAL	9	~~WESTINGHOUSE ELECTRIC~~	3
WYANDOTTE CHEMICALS	9	~~AMERICAN ZINC OXIDE~~	2
GENERAL TIRE AND RUBBER (AEROJET)	8	~~ABBOT LABORATORIES~~	2
HOOKER ELECTROCHEMICAL COMPANY	8	AIR-PRODUCTS, INC.	2
PHILLIPS PETROLEUM	8	BASIC REFRACTORIES	2
INDUSTRIAL RAYON CORPORATION	7	BALDWIN-RUBBER COMPANY	2
NORTH AMERICAN AVIATION,INC.	7	VIRGINIA SMELTING CO	2
OWENS CORNING FIBERGLAS	7	MINNESOTA MINING AND MANUF. Co	2
U. S. RUBBER	7	DORR-OLIVER COMPANY	2
ARMCO STEEL CORPORATION	6	DOW-CORNING	2
ETHYL CORPORATION	6	EMERY INDUSTRIES	2
FOOD MACHINERY	6	TRETOLITE CORP	2
GLIDDEN COMPANY	6	DEVOE-REYNOLDS CO	2
LUBRIZOL CORPORATION	6	EAGLE PITCHER LEAD CO	2
NATIONAL LEAD	6	CHEMINEER INC	2
NATIONAL STARCH	6	DURIRON COMPANY	2
NAVAL ORDANCE TESTING STATION	6	ABBOTT LABORATORIES	2
OWENS ILLINOIS GLASS	6	BRUSH BERYLLIUM	2

GOOD YEAR TIRE AND RUBBER COMPANY

ATOMIC CORP.

1. MITCHELSON, JAY B. Supt of Chem. Operations, Portsmouth, Ohio M'37-P'45
2. NIMITZ, ROBERT H., Jr. Engr. , Portsmouth, Ohio B'54
3. OYLER, LESTER T., Safety Engr., Portsmouth, Ohio B'41
4. RINEHART, VERNE R., ENGR, Portsmouth, Ohio B.'50M'51
5. FOLTZ, HOWARD L., Portsmouth, Ohio B.'55
6. BAKER, DON, Portsmouth, Ohio B.'58

TIRE AND CHEMICAL DIVISION

7. BURKLEY, C. J., Dev. Engr., Akron, Ohio B.'11
8. BURGOON, WILLARD T. (DECEASED JULY 1947) B.14
9. WOLFE, W.D., Research Chemist , Akron, Ohio M. 17
10. BUTTS, DORAIN C., Supt. Research Bldg., Akron, Ohio B.'23
11. LYON, GEORGE R., Prod.Mgr., Synthetic Rubber, B.'23
12. MICHAELS, ALTON C., Plant Mgr., Gladsen, Alabama B.23
13. CARTER, R.S. (DECEASED), B.'24
14. MARTIN, RALPH C., Research, Akron 16, Ohio B.'29
15. CRAWFORD, MARION ., Piketon, Ohio B.'29
16. GILL, HOMER ., Asst. Chief Compounder, St Marys, Ohio B.'32
17. FLIGOR, KENNETH, K., Head of Plastics Section, Akron, Ohio B.'33
18. SUDMAN, CHARLES F., Sales Engr., Akron, Ohio B.'33
19. CROYSDALE, WALTER, Tech. Supt, Jackson, Michigan B.'34
20. SMITH, WILLARD C., Section Head, Akron, Ohio M.'37
21. CONAWAY, ROBERT W., Head Dev. Section, Los Angeles, California B/38 39
22. WENDT, MERLE, Mgr. Chemical Development, Akron, Ohio B.'38
23. MITCHELL, ROBERT PAUL, Compound Dev., Goodyear, St.Mary's Ohio/ B.'39
24. THOMAS, DAVID, Manager, College Recruiting B.'41
25. RUESE, PAUL W., Compounder, St. Mary's Ohio B.'41
26. [illegible] B.'41
27. DUPLAGA EDMOND Good year Aircraft, Akron, Ohio B.42
28. LOWMAN, MAURICE, Compound Dev., St.Mary's Ohio B.'42
29. LINTALA, DONALD E., Akron B.'42
30. MANCHESTER, FRANK H., Plant Manager, Pathfinder Chemical Corp. B.'25
31. BEDFORD, L.A., Akron, Ohio B.'35
32. DEBRUIN, W.H., Dev. Engr., Detroi, Michigan B.'26
33. HUMPHRY, MAX H., Chemical Engr., Akron, Ohio B.'48
34. LEEDY, ROY B. - Synthetic Rubber Corp., Akron, Ohio B.'42
35. DANNEMILLER, HOWARD S. - Airfoam Tech. Ser., Akron 15, Ohio B.'43
36. EPSTEIN, GEORGE - Sr. Dev. Engr., Goodyear Aircraft, Akron, Ohio B.'44,M.'48
37. HANLIN, JAMES G. - Latex Corp., Akron, Ohio B.'47
38. WALLACE, LEROY - District Mgr., Stow, Ohio B.'48
39. GUNNERSON, HANFORD L. - Chem. Engr., Akron, Ohio B. and M.'48
40. BURKHOLDER, THEODORE B. - Airfoam Dev. Compounder, Akron, Ohio B.'50
41. BARTRUG, NORMAN - Plant Training Program, Akron, Ohio B.'51
42. YOUNG, ROBERT M. - Chem. Engr., Akron, Ohio B.'51
43. POTTER, WILLARD H. - Chem. Engr., Akron, Ohio B.'53

ARGONNE LABORATORIES

1. STEELE, LARRY - Chem. Engr., Chicago, Illinois B.'58,M.'58

THE OHIO STATE UNIVERSITY
CHEMICAL ENGINEERING ALUMNI AND THEIR COMPANIES

B=Bachelor; M=Masters; P=Ph.D.; C=Professional

AMERICAN CYANAMID

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY, CITY or DEPARTMENT	DEGREE AND YEAR
1.	MOORE, HARRY A. Secretary General, Suggestion Committee N.Y.C. was Plant Manager at Latrobe	Now Retired? - Fort Lauderdale, Florida	B, '13
2.	NORRIS, WAYNE C. Tech. Department	30 Rockefeller Plaza, N.Y, N.Y.	B. '23
3.	LANDES, CHESTER G., Head, Paper Chemicals,	Stamford, Connecticut	B. '26
4.	COOKE, ELMER W., European Tech. Rep.	Bush House, London, England	B.'30, M.'31 P.'33.
5.	FROMM, GEORGE E., Western Regional Mgr., Paper Chem. Dept.,	Chicago, I	B.'33
6.	RUFFER, RICHARD C., Plant Mgr.,	Valdosta, Georgia	B. '36
7.	LAMBERT, ROBERT L., Asst.Mgr., Chemicals Dept.,	N.Y. 20, N.Y.	B. '40
8.	COVER, MINOR D., Proj Coordinator	Willow Island, W.Virginia	B. '43
9.	FIFE, HAROLD E., Plastics and Resins	Div., Mfg.Dept., Rocherfeller Plaza, N.Y.	B. '47
10.	HYMAN, DANIEL., Chem. Engr.	Stamford, Connecticut	M. '48
11.	HEIDENREICH, ALLAN, Process Engr.,	Fiber Div., Pensacola, Fla.	B.'48, M.'52
12.	WHITEHEAD, KENNETH E., Chem.Engr.,	Res. and Devel., Niagara Falls, Ontario, Canada (North American Cyanamid Limited)	M.'53
13.	HAZELTON, JAMES P.	Bound Brook, New Jersey	B. '56
14.	SCHARF, E. J. - Proc. Engr.	Bound Brook, New Jersey	B.'51, M'51 P.'57
15.	YARRINGTON, ROBERT M., Chem. Engr.	Bound Brook, New Jersey	B'51, M'55 P.'58
16.	BONTA, SIMON, JR. - Chem. Engr.,	Calco Chem. Div., Bound Brook, NJ	B.'41

ANSUL CHEMICAL CO.

NO.	NAME AND POSITION	DIVISION, CITY	DEGREE AND YEAR
1.	GALLOWAY, JOHN R., Mid-Continent Chem.Products Mgr.,	Chicago, Illinois	B.'48

ALLIED CHEMICAL AND DYE CORPORATION

NO.	NAME AND POSITION	DIVISION, CITY	DEGREE AND YEAR
1.	HULL, BRICE S., (DECEASED) Branch Mgr.,	Solvay Sales Corp.	B.'14, M.'15
2.	MILLER, RICHARD A., Gen'l Foreman,	Semet-Solvay Div., Ashland, Ky.	B. '36
3.	OGDEN, RICHARD E., Sr. Res. Chem.,	Hopewell, Virginia	B.'39, M.'40
4.	BROWN, HAROLD F., Utility Foreman,	Semet-Solvay Div., Wyandotte, Mich	B.'41
5.	SOMERSET, DONALD E.,	Mutual Chem. Div., Baltimore Md.	B.'41
6.	CHANG, IRVING B., Chem.Engr.,	Barrett Div., Edgewater, N. J.	M.'48
7.	ERNEST, F. M., Tech.Ser.Dept.,	Solvay Div., Syracuse, N. Y.	B.'48
8.	MARTING, JOHN C.,	Semet-Solvay Div., Ironton, Ohio	B.'48
9.	RADO, THEODORE, Ass't. Super H_2O_2 Plant,	Solvay Div., Syracuse, N.Y.	B.'49
10.	FLOYD, DONALD G., Supervisor,	Syracuse, New York	B.'50
11.	MACGREGOR, ROB ROY, JR., RES.ENGR.,	Nitrogen Div., Hopewell, Va.	B. and M.'51
12.	GAYLORD, C. W., Project Engineer,	General Chem. Div., Camden, N.Y.	B.'37, M.'38
13.	VASILOSKY, JOSEPH - Chemist,	Semet-Solvay Div., Pittsburgh, Pa.	B.'36
14.	KAIL, IRA JOSEPH - Engr. Res.,	National Aniline Div., Buffalo, N.Y.	B.'39, M.'40
15.	MEZGER, KARL W. - Prod. Supv.,	Moundsville, West Virginia	B.'51

B=Bachelor; M=Master; P½Ph.D.; C=Professional

UNIVERSITIES

NO.	NAME AND POSITION IF KNOWN - DEPARTMENT, POSITION AND UNIVERSITY	DEGREE AND YEAR
1.	DEMOREST, DANA J. - Chairman, Dept. of Metallurgy OSU (Deceased)	B.'07
2.	SWEENEY, ORLANDO R. - Iowa State College, Ames, Iowa (Deceased)	B.'09
3.	GIESY, PAUL M. - Prof. of Chemistry, 181 Belleville, Bloomfield, N. Jer. (Retired)	B.'12
4.	**VILBRANDT**, FRANK C. - Head, Ch.E., Virginia Polytechnic Institute, Blacksburg, Va.	M.'16 P.'20 C.'35
5.	LORD, JAMES O. - Prof. Metal. Engr., OSU	B.'15
6.	DUNCOMBE, CHAS. G. - Head Ch.E., University of Detroit, Detroit, Michigan	B.'16 M.'29 P.'31
7.	HAMMOND, WILLIAM A. - Professor Chem., Antioch College, Yellow Springs, Ohio	M.'17 P.'29
8.	FISHER, ROBERT A. - Professor, Virginia Polytechnic Institute,	B.'18 M.'19 P.'32
9.	MANN, EDWIN W. - Instructor, Rose Polytechnic Institute, Terre Haute, Indiana **- DECEASED**	B.'18 M.'33 P.'39
	RALSTON, J. G. - Head Chem. Dept., Muskingum College, New Concord, Ohio (Deceased)	M.'19
11.	MARTIN, CLARE S. - Prof.&Head of Chem. Dept. Bowling Green State University, Bowling Green, Ohio	M.'19 P.'23
12.	MICHAEL, LYLE J. - Chairman, Dept. of Chemistry, Otterbein College, Westerville, Ohio	M.'20
13.	KARSTEN, ANDREW - Prof. Ch.E. South Dakota School of Mines, Rapid City, S. Dak.	P.'22
14.	STOUT, LAWRENCE E. - Professor, Washington University, St. Louis, Mo.	M.'22 P.'24
15.	REED, R. D. - Chairman Science Dept., State Teachers College, Montclaire, N. Jer.	M.'20 P.'28
16.	KAY, WEBSTER B. - Professor, Ch.E., OSU, Columbus, Ohio	B.'22
17.	ESTABROOK, GAYLORD B. - Professor Physics, University of Maryland, Baltimore, Md.	M.'22
18.	KINTNER, ROBERT C. - Ch.E. Dept., Ill. Inst. of Technology, Chicago, Ill.	B.'22 M.'29 P.'31
19.	DIXON, TOD B. - Chairman Ch.E., Ind. Tech. College, Ft.Wayne, Ind.	B.'23 M.'30 P.'32
20.	OSTERHORF, G. G. - Head Ch.E. Dept., S.Dak. School of Mines, Rapid City, S. Dak.	P.'23
21.	KOFFOLT, J. H. - Chairman Ch.E. Dept. OSU, Columbus, Ohio	B.'24 M.'29 P.'31
22.	FARGUS, ARNOLD (BROTHER) - O.F.M. Christ the King Seminary, St. Bonaventure U., St. Bonaventure, N. Y.	B.'24
23.	HERSHBERGER, ARLAN R. - Head Chem. Dept. Westmar College, Le Mars, Iowa	M.'25 P.'39
24.	OWENS, CHARLES R. - Instructor Ch.E., OSU, Columbus, Ohio **DECEASED**	B.'27 M.'30 P.'34
25.	SIMONS, HOWARD P. - Prof. Ch.E., W.Vir. University, Morgantown, W. Vir.	B.'28 M.'47 P.'49
26.	**MACHWART**, GEORGE M. - Professor Ch.E., Michigan School of Mines, Houghton, Michigan	P.'30

B=Bachelor; M=Master; P=Ph.D.; C=Professional

HIGH SCHOOLS

NO.	NAME AND POSITION IF KNOWN - DEPARTMENT, POSITION AND UNIVERSITY	DEGREE AND YEAR
1.	MAIN, H.V. - Teacher, Harrison High School, Chicago, Ill.	B.'09
2.	GEORGE, JAMES E. - Dir. Industrial Ed., Johnstown Public Schools, Pa.	B.'17
3.	MONG, WILLIAM L. - Teacher, Cleveland E. Tech. Cleveland, Ohio	B.'16
4.	WOLFE, RICHARD E. - Asst. Prin. Clyde High School, Clyde, Ohio	B.'22
5.	FISKE, PAUL - Principal Sugar Creek School, Athens, Ohio	w.'22
6.	GIBBS, RALPH N. - Head Dept. of Sc ence, Edison Tech. H.S. Rochester, N.Y.	B'30M'32
7.	FOURNIER, EDWARD H. - Prin. High School, Portsmouth, Ohio	B.'30 M.'33
8.	SCHANTZ, MILTON - Supt. of Schools, Greenwich, Ohio	M.'31
9.	HUTT, T. M. - Teacher, Waterford High , McConnelsville, Ohio	M.'47
10.	ALBRECHT, CHARL H. - Principal, Norwood High School, Norwood, O.	M.'33

UNIVERSITIES (CONT'D.)

46.	BROWN, WILSON F. - Univ. of Florida, Gainesville, Fla.	B.'16, M'27, P'28
47.	BUEHLER, C. A. - Hd. Chem. Dept., Univ. of Tennessee, Knoxville	B.'18, P'23
48.	CHOPPIN, A. R. - Dean, Chemistry and Physics, Louisiana State Univ. Baton Rouge, Louisiana	P.'29
49.	CHETRICK, M. H. - Univ. of Louisville, Louisville, Kentucky	P.'43
50.	HANG, RICHARD I. - Asst. Prof. Engr.Drawing, Ohio State Univ., Columbus 10, Ohio	B.'46, M'52
51.	BOCKHORST, DAYLE F. - Univ. of Kansas, Lawrence, Kansas	B.'49
52.	BONN, GEORGE S. - Rutgers Univ., New Brunswick, N. J.	B.'35, M.'36
53.	RUBIN, BERNARD - Univ. of Calif., Livermore, California	M.'50
54	Horton Paul (Chairman Retired) Lousiana State College, Baton Rouge	B'19
55	Dixon Tod -Chairman Chem Engr Dept., Indiana Tech, College	B'23

B=Bachelor; M=Master; P=Ph.D.; C=Professional

UNIVERSITIES

NO.	NAME AND POSITION IF KNOWN - DEPARTMENT, POSITION AND UNIVERSITY	DEGREE AND YEAR
27.	MINNEAR, F. L. - Asso. Prof. Inorganic & Ind. Chem. North Dakota Agric. College, Fargo, N. Dak.	P.'30
28.	BLACK, C. J. - Washington College, Chestertown, Md.	P.'31
29.	KOENIG, JOHN H. - Head, Ceramics Dept. Rutgers University, New Brunswick, N. Jer.	B.'31 M.'36 P.'39
30.	PLANCK, IVAN A. - Chairman & Professor, Mech.Engr., Indiana Tech. College, Ft. Wayne, Ind.	B.'31 M.'32 P.'34
31.	SCHOENBORN, E. N. JR. - Chairman, Ch.E., N.C. State College, Raleigh, N. Car.	B.'32 M.'34 P.41
32.	WEINLAND, LOUIS - Asst. Prof. Chem., N.Y. State College of Ceramics, Alfred University, Alfred, N.Y.	M.'35
33.	ROY, LELAND F. - Prof. Ch.E., University of Mississippi, University, Miss.	B.'36 M.'37 P.'39
34.	SHANK, WILLIAM C. - University of Pennsylvania (Deceased)	B.'37 M.'38
35.	MINARD, GEORGE W. - Prof. Ch.E. Buchnell University, Lewisburg	
36.	TAYLOR, FRANCIS M. - Professor Ch.E. Tulane University, New Orleans, La.	P.'42
37.	KEARNS, CLYDE H. - Instructor, Ch.E. OSU, Columbus, Ohio	B.'42 M.'50
38.	SMITH, EDWIN E. - Assoc. Prof. Ch.E. OSU, Columbus, Ohio	B.'44 M.'47 P'49
39.	WILSON, THOMAS - Asst. Prof. Univ. of S.Car., Columbia, S.Car.	B.'43 M.'44 P.'49
40.	GERSTER, JACK A. - Prof. Ch.E., University of Del., Newark, Del.	B.39 M.'40
41.	ELSAESSER, LOUIS O. - Chem. Inst., West Point, N.Y.	B.'46 M.'53
42.	DURST, RICHARD E. - Prof. Dept. of Ch.E., University of Me., Orono, Me.	P.'48
43.	AVERETT, WILLIAM K. - Asso. Prof. Southwestern La. Inst., Lafayette, La.	B&M.'50
44.	HANRATTY, THOMAS J. - Asst. Prof., Univ. of Ill., Urbana, Ill.	M.'50
45.	REBERT, CHARLES J. - Asst. Prof. Ch.E. USC, Los Angeles, Calif.	P.'55

FOREIGN TEACHERS

1.	LIU, T. - Dean Nat. N.W. United Univ., Szchewan, China	P.'26
2.	WU, C. - Ch.E. Dept. Soochow University, Soochow, China	B.'26
3.	MA CHIEH (As of '56) - Teacher, College of Changking, China	B.'27 M.'28 P.'30
4.	OU-VANG, Vi - Chem. Prof., Nanchang, Chung Cheng Med. College Kiangsi, China	B.'29 M.'31 P.'33
5.	YANG, S. C. - Agriculture Chem. Professor, Nan Tung Univ.	P.'32
6.	MALVEA, BOANERGES BONNIE - Principal, Ewing Christian College, Allahabad, India (Deceased)	P.'30
7.	SANGHVI, M.,.D. - Head, Dept. Chem. Tech., Matunga Rd. Bombay 19, India	B.'51 M.'53 P.56
8.	**SALONGA,** MRS. LUZ A. - Ch.E. Instructor, Univ. of Phillipines	B.'51 M.'53
9.	ELLIOTT, VICTOR V. - Dean of Probationers, Mica College, Jamaica, B.W.I.	W.'53

B=Bachelor; M=Master; P=Ph.D.; C=Professional

ARABIAN-AMERICAN OIL COMPANY

NO. NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1. NEUHART, FRED C. - New York, New York		B.'38
ASHLAND OIL AND REFINING		
1. CATRON, JOSEPH W. - Chem. Engr., Ashland, Ky.		B.'36
2. GRIEST, JOHN R. - Supvr., Ashland, Ky.		B.'38
3. SHUSTER, ROBERT M. - Asphalt Sales. Engr., Columbus, Ohio		B.'49
4. FEASEL, THOMAS O. - (Deceased) Ashland, Ky.		B.'49
CALIFORNIA TEXAS OIL COMPANY		
1. KELLEY, VAUGHN E. (Deceased) Persian Gulf		B.'42
CONTINENTAL OIL COMPANY		
1. CHENEVY, JOHN E. - Staff Engr., Houston, Texas		B.'39
CROWN OIL PRODUCTS COMPANY		
1. ARONOFF, SAM - Vice President, Long Island, New York		B.'27
DAURA REFINERY		
1. UTHMAN, A. A. - Lube and Asphalt Coordinating Dept., P.O. Box 278, Baghdad, Iraq		B.'54
DUPERIAL S. A.		
1. MARZANO, EMILIO D. - Tech. Dept., Buenos Aires, Argentina		w.'51
GENERAL PETROLEUM COMPANY		
1. KIRKMAN, FRANK S. - Ferndale, Michigan		B.'47
GULF OIL COMPANY		
1. COOKE, HORACE B. - Patent Counsel, Pittsburgh 30, Pa.		B.'22
2. HOUGHTON, GERALD - Research and Development		M.'51
LION OIL COMPANY (El Dorado, Arkansas)		
1. APPLEGATH, FRED		M.'47
LUBRIZOL CORPORATION		
1. MC MILLEN, RICHARD L. - Process Engr., Wichliffe, Ohio		B.'43
2. HAWKEY, ROE - Production Supvr., Wickliffe, Ohio		B.'47
3. BAUMAN, FRANK A. - Pilot Plant Design Supvr., Cleveland 17, Ohio		M.'48
4. OLAFSON, RICHARD - Supvr., Wickliffe, Ohio		B.'49
5. SCOTT, RICHARD L. - Supvr., Pilot Plant		B.'50
6. RAYMOND, ALLAN J. - Jr. Chem. Engr., Pilot Plant		B.'57
MAGNOLIA PETROLEUM CORPORATION		
1. MILNE, JOHN R. - Sr. Res., Dallas Texas		P.'50
OHIO OIL COMPANY		
1. HOELSCHER, JULIUS - Engr. Supvr. Robinson Illinois		B.'29
2. RUSSELL, JOHN W. - Robinson, Ill. B'41;Geo.Ditrick,Denver Ill		B.'~~58~~
PURE OIL COMPANY		
1. THOMPSON, JAMES A., Chemist, Calm Creek, West Virginia		M.'26
2. MUELLER, FREDERICK L., Project Engr., Crystal Lake, Illinois		B.'32
3. LAWLESS, WILLIAM J., JR., Asst. Supervisor, for operations		B.'34
4. JACKSON, WILLIS E., Corrosion Engr., Toledo, Ohio		B.'39
5. GLASS, DEAN C., Manager, Pipeline Department, Chicago, Illinois		B.'43
6. HARRISON, JAMES R., Heath Refinery, Newark, Ohio		M.'50
SINCLAIR RESEARCH LABS, INC.		
1. UHL, GEORGE A. - 400 E. Sibley Blvd., Harvey, Ill., Nuclear Engr.		M.'47
2. TRUEX, GARY L. - Sinclair Refining, Harvey, Ill., Chem. Engr.		B&M.'57
3. BECKBERGER, LAVERNE H. - Project Engineer		B.'41
SUN OIL COMPANY		
1. MATHIAS, RAPHAEL J. - Chem. Engr. (Tech. Info.) Toledo, Ohio		B.'30
2. METZLER, JOHN F. - Genl. Foreman, Marcus Hook, Penna.		B.'32
3. OWEN, HOWARD - Toledo, Ohio		B.'34
4. THOMAS, WILLIAM D. - Chem. Engr., Woodville, Ohio		B.'43
5. HELMS, JON D. - Chem. Engr., Toledo, Ohio		B&M.'57

B=Bachelor; M=Master; P=Ph.D.; C=Professional

KOPPERS COMPANY

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	KOHR, A. A. - Tech. Advisor, Kearney, N. Jer.	P.'14
2.	KLAIBER, WALTER J. (Deceased) Pittsburgh, Pa.	B.'22
3.	GUNYOU, ELTON, BRANDON - Mgr. Nuclear Engr. Div., Nuclear Products Section	B.'37, M.'38 P.'40
4.	SARCHET, BERNARD R. - Mgr., Development	B.'39, M.'40
5.	KIMMEL, ELLSWORTH E. - Mgr., Tech. Admin., Chem. Div.	B.'39
6.	HATFIELD, PAUL - Monaco, Pa.	B.'42
7.	KIRNER, ANDREW R. - Nite Supvr., Tar Products Div., Youngstown, O.	w.'43
8.	BAKER, PAUL W. - Chem. Dir. Pittsburgh, Pa.	B.'48
9.	STEWART, DAVID F. - Kabuta Plant, Monaca, Pa.	B.'49
10.	UEBELHART, JAMES J. - Chem. Div., P.O. Box 92, Monaca, Pa.	M.'50
11.	IMMEL, RICHARD H. - Planning Engr., Pittsburgh, Pa.	B.&M.'50
12.	LAVIN, JOHN H. - Asst. Chem. Engr., Verona, Pa.	B.'51
13.	SAYLOR, RICHARD - Tech. Rep., Chem. Div., New York 22, N. Y.	B.'52
14.	TALLARICO, MICHAEL A. - Engr. Tar Products Div., Follansbee, W.Va.	B.'53
15.	HAJJAR, RAJA - Dev. Engr., Kobuta Plant, Pittsburgh, Pa.	M.'56

MEAD CORPORATION

1.	LAYMON, H. W. - Public Relations, Dir., Chillicothe, Ohio.	B.A.'16
2.	HENDRICKSON, E. C. - Asst. Supt. of Paper Bills	B.'23
3.	RUFF, H. T. - Deceased	P.'24
4.	CULP, FRED EVERSON - Group Leader, Paper Mfg. Res. Chillicothe, O.	B.'36 M.'39
5.	SHEETS, GEORGE H. - Manager	B.'37 M.'39 P.41
6.	CALDWELL, HENRY G. - Group Leader, Pulping & Bleaching Res., Chillicothe, Ohio	B.'41 M.'42
7.	HORCH, CHARLES H. - Genl Supt. Wheelwright Div., Leominster, Mass.	B.'42
8.	TERRY, DUNBAR - Dev. Engr., Chillicothe, Ohio	B.'42 P.'45
9.	SHRIVER, E. H. II - Research and Development, Chillicothe, Ohio	B.'42 M.'48 P.'50
10.	LEWIS, GEORGE R. - Res. Engr.	B.'48 M.'49 P.'51
11.	KELLEY, RICHARD F. - Dev. Engr., Res. and Develop. Lab	B & M. '50
12.	BOTTENFIELD, WILLIAM - Engineer	B.'52
13.	WISEMAN, ROBERT A. - Research and Development	B & M. '53

CHAMPION PAPER AND FIBER CO.

1.	LAUDERMAN, VINCENT A. - Res. Chemist, Hamilton, Ohio	B.'26
2.	DOUTT, FRED V. - Chief Chemist, Canton, North Carolina	B.'20
3.	TAYLOR, WILLIAM A. - Supt. of Coating, Hamilton, Ohio	B.'36

CROWN ZELLERBACH CORPORATION

1.	GRIFFITH, JOHN B. - Sr. Ch.E., Camas, Washington	B.'48 M.'50

CRYSTAL TISSUE CO.

1.	CLARK, PAUL E. - Chief Chemist - Middletown, Ohio	B.'42

B=Bachelor; M=Master; P=Ph.D.; C=Professional

GENERAL ELECTRIC COMPANY

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	HUTTON, VIRGIL C. - Chem. Engr., Delco Prod., Dayton 9, Ohio	B.'24
2.	LEE, MAX M. - Specialist, Polymers, Ft. Wayne, Indiana	B.'31
3.	SMITH, ROY E. - Proc. Engr., Waterford, New York	B.'32,M.'33
4.	ROHRMAN, CHARLES A. - Sr. Engr., Richland, Washington	B.&M.'36,P'39
5.	DERBYSHIRE, LOWELL G. - Application Engr., Laminated & Insulating, Prod. Dept., Coshocton, Ohio	B.'37
6.	FOLKERTH, DAVID B. - Sales Engr., Columbus, Ohio	B.'37
7.	DEWART, ROBERT - Drafting Supv., G.E. Appliance Park, Louisville, Ky.	B.'39
8.	HAY, JOHN M. - Chem. Engr., W. Richland, Washington	B.'40
9.	GRANDEY, MAX F. - Group Engr., Cincinnati 15, Ohio	B.'43
10.	CHASE, CONSTANTINE L. - Adv. & Sales Promotion, Specialist, Chem. Materials Dept., Pittsfield, Mass.	B.'43
11.	DRAGHIC, JOHN - Supv. Met. Services, Cincinnati, Ohio	B.'44
12.	BAZLER, S. M. - Chem. Engr., Chemical Div., Coshocton, Ohio	B.'44,M.'52
13.	ROBISON, A. G. - Core Components, Dev. Engr., Cincinnati, Ohio	B.'45
14.	BRANDSTETTER, K. A. - Process Engr., Lamp Wire & Phosphorus Dept., Euclid, Ohio	B.'46 and M.'48
15.	COBB, JOHN C. - Chem. Engr., Richland, Washington	B.'47
16.	HOSKINS, JACK E. - Devel. Engr., Coshocton, Ohio	B.'47
17.	CONKLIN, CHARLES W. - Project Engr., Waterford, New York	B.'48,M.'49
18.	PICKREL, HOWARD H., Chief Engr., Bucyrus, Ohio	B.'48
19.	VERKAMP, JOSEPH P. - Knolls Atomic Power Lab., Schenectady, New York	B.'50
20.	LEAVITT, WILLIAM C. - Tech. Foreman, Resin Plant, Schenectady, N.Y.	B.'50
21.	BOWSHER, HARLAN - Lab. Engr., Louisville, Kentucky	B.and M.'50
22.	CHANDLER, BERT - Chem. Engr., ANP, Cincinnati, Ohio	B.'51
23.	CHERNIN, MYRON A. - Dev. Engr., Nela Park, Cleveland, Ohio	B.and M.'51
24.	SUDAK, RICHARD G. - Nucleonics Dept., Hanford, Washington	M.'52
25.	GLANCY, WILLIAM - Plastics Division, Coshocton, Ohio	B.'52
26.	DECENZO, R. - Process Engineer, Coshocton, Ohio	B.'52
27.	HUCHRO, STANLEY P. - Chemical Engr., Silicone Products, Waterford, NY	M.'55

RESISTANCE WELDES CORPORATION

1.	COSGROVE, DONALD V. - Chem. Engr., Bay City, Michigan	B.'52

SHOCKLEY SEMICONDUCTOR LABORATORY

1.	FOK, SAMUEL S. M. - Senior Research, Staff Engr., Mountain View, Calif.	B.'49,P.'55

SYLVANIA ELECTRIC PRODUCTS, INC.

1.	CALVIN, DAREN E. - Chem. Engr., Prod. Engineering, Ottawa, Ohio	B.'50
2.	CONNARE, KENNETH - Contract Administrator - Buffalo, New York	B.'41
3.	HAMILTON, DAVID R. - Prod. Engr., Ottawa, Ohio	B.'50

WESTINGHOUSE ELECTRIC CORPORATION

1.	OGLESBY, GEORGE H. - Asst. Mgr., Atomic Power Div., Pittsburgh, Pa.	B.'35,M.'48
2.	FRAZIER, GEORGE C. - Atomic Power Div., P.O.Box 1468, Pittsburgh, Pa.	B.'52,M.'56
3.	LINE, JOHN G. - Materials and Process Engr., Lima, Ohio	Withdrew

LINCOLN ELECTRIC CO.

1.	GORDON, ALLEN I. - Chief Chemist, Cleveland 17, Ohio	B.'35,M.'39

CHEMICAL ENGINEERING ALUMNI AND THEIR COMPANIES

B=Bachelor; M-Masters; P-Ph.D.; C= Professional

COLUMBIA SOUTHERN CHEMICAL CORPORATION

1. KISSLING, LEHR F., Development, Barberton, Ohio B.'22, M.'32
2. SNYDER, STANLEY, Asst. Prod.Supr., Corpos Christi, Texas B.'34
3. SWISHER, WILLIAM E., Supt Chloria, New Martinsville B.'35, M'36
4. MILLS, PAUL A., Business Org. Barberton Labs, Barberton, Ohio B.'36
5. DOOLAN, WILLIAM H., Dev. & Service Engineer, Pittsburg B.'37
6. SHARR, PHILIP E., Technical Superintendent, New Martinsville B.'37
7. FODOR, PAUL A., Asst. Director of Sales, Pittsburgh 22, Pennsylvania B.'40
8. SINDLINGER, CHARLES, Development Supervisor, Corpus Christi, Texas B.'41, M.'42, P'49
9. LAMBILIOTTE, JOHN, Supt. of Power, Pittsburgh, Pennsylvania B.'42, M'46
10. HARRIS, LEONARD A., Prod. Supt., Barberton, Ohio B.'43
11. HARRIS, WILLIAM R., Oper. Superintendent, Barberton, Ohio B.'44
12. STRICKLER, G.C. JR., Area Supt., Barberton, Ohio B.'44
13. DUPRE, DALLAS O., Area Engineer, Organics Area, Barberton, Ohio B.'47
14. HAMMOND, WILLIAM L., Chemical Engr., Barberton, Ohio B.'48
15. HAMMOND, RAYMOND D., Sales, Cleveland, Ohio B.'49
16. ALLEN, ROBERT M., Production Supt., North Plant, Barberton, Ohio B. & M. '50
17. NELSON, JAMES R., Development ., Barberton, Ohio B'51
18. VOGT, HARVEY, Chem Engr., Corpus Christi, Texas B. &M. '52
19. ALDRICH, ROBERT, Supervisor, Chem. Co. Barberton, Ohio B.'52
20. SEIVING, PAUL H., Power Engineer, Barberton, Ohio- B.'52
21. FARST, JAMES R., General Foreman, Barberton, Ohio B.&M.'56
22. MUREN, ALBERT P., Chemical Engineer, New Martinsville, W.Va. B.'56
23. FLACK, WALTER, Res& Dev. Asst., Cement Plant, Zanesville, Ohio B.'57
24. KREAGER, L. KEITH, Prod. Engr., Barberton, Ohio B.'57
25. SCHARF, MARCUS D., Chemical Engineer, Chlorine Department, Barberton B.'58
26. DARR, DONALD E., Process Engr., Barberton, Ohio B.'48
27. KISTLER, RICHARD P. - Cement Division, Zanesville, Ohio B.'58
28. PETRITIS, VALDIS - Chem. Engr., Barberton, Ohio B.'58
29. LOY, THOMAS - Chem. Engr., Barberton, Ohio B.'58

CUTLER HAMMER, INC

1. DAVIS, JAMES E., Development Supervisor, Milwaukee, Wisconsin no grad Cand. for Mas

COHART REFRACTORIES COMPANY

1. BAQUE, HAROLD W., Vice Pres Pittsburgh Pennsylvania B'21

COMMERCIAL SOLVENTS BORP

1. DAVIS, MURRAY L., Engineering Division, Terre Houte, Indiana M'51

CATALINE CORPORATION OF AMERICA

1. HOOPER, ROBERT W., Chem Eng and Ass*t Production Head, Fords, New Jersey B'40

CHEMINEER, INC.

1. BATES, ROBERT L. V.P. Technical Director B'48
2. FONDY, PHILIP L., Dayton, Ohio B.&M.'57

B=Bachelor; M=Master; P=Ph.D.; C=Professional

GENERAL MOTORS CORPORATION

NO.	NAME AND POSITION IF KNOWN — DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	CASE, LEWIS B. - Research Lab. Div., Detroit, Michigan (RETIRED)	B.'06
2.	FLOWER, ARTHUR H. (RETIRED) 541 S.W. 39th Ave., Miami, Fla.	B.'07,P.'35
3.	McDORMAN, PAUL (DECEASED) - Chemist, Frigidaire Div., Dayton,Ohio	B.'08
4.	MAEDER, RICHARD - Chem. Engr., Frigidaire Div., Dayton, Ohio	B.'16
5.	BOYD, THOMAS A. - (RETIRED) Research Lab., Detroit, Michigan	B.'18,C.'38
6.	HUTTON, VIRGIL - Delco Prod., Dayton, Ohio	B.'24
7.	WENING, HERMAN E. - Rubber Technologist,Chief Compounder,Inland Division, Dayton, Ohio	B.'25
8.	HAMILTON, HAROLD R. - Chemist, Metallurgist,Turnstedt.Div.,Col's.	B.'30
9.	BENSON, GERALD L. - Sr.Proj.Engr.,Cadillac Division,Cleveland,O.	B.'38
10.	CAMMERER, NORMAN C. - Proj. Engr., Frigidaire Div., Dayton,Ohio	B.'38
11.	THEADO, RICHARD P. - A.C. Spark Plug Co.,Plant #1,GMC,Flint,Mich.	B.'39
12.	JACKS, JOHN A. - Res.Chem.,Ternstedt Div., Detroit 9, Michigan	B.'39,M.'40
13.	BUCHANAN, DOYLE R. - Rubber Chemist,Inland Mfg.Div.,Dayton,Ohio	B.'43
14.	CHRISTIANSON, H.S. - Proc.Engr.,Turnstedt Div.,Columbus 4,Ohio	B.'43,M.'50
15.	BUSKIRK, JOHN E. - Engr., Delco Batteries, Muncie, Indiana	B.'48
16.	JOHNSON, Mrs. J.A. - Materials and Dev. Lab., Allison Div., Indianapolis, Indiana	B.'48
17.	KRAUS, ROBERT E. - Rubber Compounder, Inland Mfg.Div.,Dayton,O.	B.'48,M.'49
18.	MILLER, RICHARD N. - Inland Mfg. Div., Dayton, Ohio	B.'49
19.	KRUGER, RINE JR. - Chief Engr., Batteries, Delco., Muncie, Ind.	B.'49
20.	SHEPHERD, CHARLES R., Jr. - Delco Batteries, Muncie, Indiana	B.'49
21.	HARDESTY, DAVID W. - Res. Engr., Detroit 2, Michigan	B.andM.'50
22.	REIN, HAROLD F. JR. - Staff Ass't., Fisher Body Div., Detroit,Mich	B.and M.'50
23.	BUSKIRK, DAVID E., Chief Engr., Delco Div., Muncie, Indiana	B.'53
24.	BOWMAN, BYRON A. - Supv.Proc.Dept., Aero Products, Allison Div., Dayton, Ohio	B.'53
25.	MOUGEY, H. - Tech Director (RETIRED) Research Labs., Detroit,Mich. Residence: 11 La Cuesta Dr., San Rafael, California	B.'11
26.	WOODFORD, W. D. - A.C. Spark Plug Co., Div.GMC, Flint,Michigan	B.'39

GENERAL TIRE AND RUBBER AND (AEROJET)

1.	CRAMER, MARCO - Aerojet, Azusa, California	B.'40,M'41,P'49
2.	WALDVOGEL, ROBERT L. - Production Mgr.,General Tire and Rubber, Akron, Ohio	B.'41
3.	CORE, THOMAS C. - Aerojet, Azusa, California	B.'49
4.	LINDBERG, C. D. (?) - Chemist, Akron, Ohio(General T. and R.)	B.'50
5.	JEFFERY, DWIGHT - Gen'l. Foreman, Magadore, Ohio	B.'52
6.	KAISER, WILLIAM - Proc. Engr., Magadore, Ohio	B.'52
7.	GRINS, MARGERS - Process Engr., (General T. and R.) Akron,Ohio	M.'55
8.	CORE, THOMAS C. - Aerojet, Azusa, California	B.'56

FORD MOTOR COMPANY

1.	BLUME, PAUL W. - Quality Control Engr., Dearborn, Michigan	B.'32

CHRYSLER CORPORATION

1.	FAGLEY, WALTER S. - Project Engr., Detroit, Michigan	B.'48

PARKE-DAVIS COMPANY

1. SHENEFIEID, SAMUEL L., Superintendent, Detroit Michigan B'18
2. FORD, FRED A., Asst to Director of Production, Detroit, Michigan B'21
3. WORLEY, DONALD M., Supt. Materials Control, Detroit Michigan B'21
4. SCHWENSEN, ALBERT, Detroit, Michigan, B'23
5. THOMA, J.C. (DECEASED) Dept Mgr., Detroit, Michigan B'26
6. MITCHENER, WILLARD B., Dept. Mgr., Bio Finish Dept. Detroit, Michigan B'27
7. WALKE, EARL WM., Director Us. and Canadian Production Detroit, Michigan B'28
8. **VACLAVICK,** FRANK, Aea Engr., Detroit, Michigan B'41
9. OGLEVEE, HAROLD J., Dept Mgr., Detrcit, Michigan B'46
10. WIANT, MARION PATTERSON, Department Mgr. Capsule Engr. Detroit, Mich. B'47

PENNSYLVANIA GLASS SAND CORPORATION

1. MIUS, NORMAN A., Purchasing Agent B'15

PROCESS RESEARCH INC.

1. INSKEEP, GORDON C., Asst to Pres. B'43

PENNSYLVANIA SALT MANUFACTURING COMPANY

1. KALLAY, BILL, Chief Engineer, Wyandotte, Michigan B'42

PROCTOR AND GAMBLE COMPANY

1. COITH, H.S., Associate Chemical Director, Ivorydale, Ohio M'16, P'18
2. FERGUSON, R.H., Research Consultant, Miami Valley Lab, Cincinnati, Ohio B'23, M'24, P'27
3. FOX, NED. S., Vice Pres (Phillipine), Staff Position, Cincinnati, O B'31
4. KEMP, BERNARD C., Development, Cinninnati, Ohio B'40
5. YOUNG, ROBERT P., Dhemical Engineer, Dreg Product Division, Ivorydale, O B'41, M cordall
6. WILDERMUTH, ROY L, Patent Attorney, Cincinnatti, Ohio B'42
7. MARTIN, JOHN BRUCE, Personnel and Training, Res and Dev. B'43, M'47, P.49
8. MIKULSKI, ALEXANDER K. Development Engineer, Ivorydale, Ohio M'47
9. ROBINETTE, DOUGLAS O., Engineer, Cinninnati, Ohio B'48
10. BATES, PAUL E., Chemical Engineer, Cincinnati, Ohio B'49
11. STRANG, DAVID A., Miami Valley Labs, Cincinnatti, Ohio B'51, M'51P;56
12. FRONING, JAMES , Process Foreman, Iowa City, Iowa B'52, M'52
13. BATES, ROBERT A, Engineer, Cincinnati, Ohio B'53, M'53
14. YERINA, JAMES ANDREW, General Foreman, St Bernard Works B'54
15. BENFORD, CHARLES L. JR., Chemical Engineer, M.A. and R. Building Cincin. B'55, M'55
16. CODY, ROBERT A. Development, Cincinnati, Ohio B'56

PHILLIPS PETROLEUM COMPANY

1. **FRIMBIE,** HAROLD M., Senior Associate Director Research, Bartlesville Oklahoma B'25
2. STEEPS, CHARLES E. , Chief Unit Ops., Bartlesville, Oklahoma B. Kansas M. Osu '48 P.5
3. SHAEFFER, DAVID W., Asst Div Mgr., St. Louis, Mo. B.'40
4. FLAVIN, THOMAS C., Economic Analysis and Coord. Engr., Bartlesville, Okla B'46, M'47
5. GOARD, HOWARD W. Chemical Engr., Bartlesville, Okla B'46, M'47
6. UBER, RAYMOND FRANCIS, Bartlesville, Okalhoma B'47
7. WARZEL, FRED MORGAN, Atomic Energy Div ABox 1259 Idaho Falls, Section Chief, CPP Process Engr. Section M'48P'51
8. WHITE, DONALD HENRY - Coordinator of Marlex Developments reporting to Mgr. and Vice-Pres. of Res. and Dev., Bartlesville, Oklahoma B.'40

B=Bachelor; M=Masters; P=Ph.D.; C=Professional
W= Student but no degree

E. I. DuPont de Nemours and Company

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	HUFFMAN, CARL H., Chief Chemist, Cleveland Works (Retired)		B.1912
2.	JACKSON, HARRY W., Works Mgr., Fortville, Indiana		B.1920
3.	CARRELL, HARRY G., Chemist, James River Works, Richmond, Virginia		B.1922
4.	McBURNEY, J. D., Chemist, Wilmington, Delaware		M.1922
5.	FANEUFF, C. E., Supv. of Belle Works, Belle, West Virginia		B.1927
6.	STILES, ALVIN B., Res. Assoc., South Charleston, West Virginia		B.'31,M.'33
7.	KRAUS, PHILIP B., Consultant, Pigments, Newark, Delaware		B'31,M'33,P'47
8.	DAMOUS, JOHN G., Supt.Prod.Div., Belle, West Virginia		B.'34
9.	SERCELJ, FRANK J., Inst. Consultant, Wilmington, Delaware		B.'35,M'36
10.	KLEINMAIER, LEE F., Sr. Engr., Kinston, South Carolina		B.'35
11.	GRAHAM, CHARLES E., 2100 Elton Avenue, Chicago, Illinois		B.'35
12.	ANDERSON, HARLAND C., Ass't. Dir. of Prod. Finishes Div.,Wil.,Del.		B.'36
13.	MILLER, DONALD C., Ass't. Manager, Antioch Works		B.'37
14.	TEAGARDEN, JOHN E., Plastics Dept., Arlington, New Jersey		M.'38
15.	McKINNEY, JOHN W., Purchasing Agent, Purchasing Dept.		B.'38
16.	PONTIUS, EUGENE - Res. Engr., Viscose Rayon Sec.,Richmond, Va.		B'39,M'39,P'50
17.	MANNER, J. E., Method Engr., Cleveland, Ohio		B.'39
18.	CHENEY, A.J.,Jr. - Prod.Specialist, Wilmington, Delaware		B.'40
19.	COOPER, PAUL D. - Group Leader, Process Div.,Chattanoga, Tennessee		B.'40
20.	KELLER, WILLIAM R., Sr.Tech. Supv., Electrochem.Dept.,Niagara Falls		B. '40
21.	HOFFMAN, PAUL B., Area Prod. Coordinator, Savannah River		B.'40
22.	HUFFMAN, ROBERT L., Cost Engr.,Control Div., Wilmington, Delaware		B.'40
23.	LESCHER, RICHARD F., Sales Technologist, Chicago, Illinois		B.'41
24.	ROBINSON, JAMES R., Service Supt., Niagara Falls, New York		B.'41
25.	BECHER, VERNON C., Prod.Area Super., Terre Haute, Indiana		B.'41
26.	WARNER, WILLIAM,III., Technical Section Engr., Charleston,W.Va.		B.'41
27.	STEWART, EMERY L., Dev. Engr., Penns Grove, New Jersey		B.'42
28.	WILLING, EDWIN G., Wilmington, Delaware		B.'42
29.	LUCKEY, GEORGE - Ass't. Tech. Supt., Sabine River Works		B.'42,M.'46
30.	BUNN, LLOYD THOMAS, Sales Technologist, Polychemicals Div.,Wil.,Del		B'42,M'49,P'51
31.	KELLEY, LYNN S., Supt., Camden, South Carolina		B.'42
32.	WHISTON, RICHARD R., District Sales Mgr.,Grasselli Chem.Dept.,Cleve,O.-		B.'42
33.	SCHMIDT, CHARLES J., Chem. Engr., Kinston, North Carolins		B. '43
34.	OLDENBURG, JOHN R., Sr. Prod. Supv., Savanna River		B. '43
35.	DRAKE, DALTON F., Dept. Supv., Richmond, Virginia		B.'43,M.'47
36.	ALBERT, ROBERT E., Res. Engr., Wilmington, Delaware		B'43,M'48,P'50
37.	DICK, MARION F., (DECEASED) Res. Engr., Textile Fibers Div., Acetate Div., Waynesboro, Virginia		B.'43,M.'47
38.	HADSELL, H.C., Works Mgr., New Castle, Pennsylvania		W.'43
39.	BRYAN, WILLIAM J., Rayon Dept., Richmond, Virginia		B.'44,M'47
40.	YOUNT, PHILIP ARTHUR - P. O. Box 347, Terre Haute, Indiana		B.'44
41.	LAWLER, JOHN V. - Market Analyst, Organics, Wilmington, Del.		B.'45
42.	WHIPPLE, GEORGE H., Chem.Engr., Polychemicals Dept., Experimental Station, Wilmington, Delaware		M.'47 and P. '49
43.	GRABILL, ERNEST C., Sales Engr., Polychemicals, Wilmington, Del.		B. '46
44.	HALL, CHARLES R., Group Supv., Eng. Dept., Wilmington, Del.		B.'46,M.'47
45.	WELLS, RAYMOND, - Prod. Supr., Parlin, New Jersey		B. '47
46.	GARRIS, RAYMOND W. - Pigments Dept.,Tech.Section,Baltimore,Md.		B.'47,M.'49
47.	SWARTZMILLER, DORAN E., Training Supt.,Sabine River Wks,Orange,Tex.		B.'47
48.	BALLARD, CHARLES C.- Supervisor, Engr. Dept., Wilmington, Del.		B.'47

D=Bachelor; M=Master; P=Ph.D.; C=Professional

E. I. DuPONT DE NEMOURS AND COMPANY

		DEGREE
49.	THOMPSON, JOHN W., Electrochemicals, Niagara Falls, New York	B.'48,M.'49
50.	GRAY, WILLIAM L., Sr. Supervisor, Savannah River, Augusta, Ga.	B. '48
51.	WIGGINS, DAVID L., Group Supv., Process Develop., Martinsville,Va.	B.'48,M.'49
52.	PURDOM, JOHN L., Sales, Polychemicals Dept.,Wilmington, Delaware	B.'48,M.'48
53.	PICKARD, DAVID F., Polychemicals Dept., Parkersburg, Virginia	B.'48,M.'50
54.	REEDER, CLYDE, JR.-Chem. Engr., Wilmington, Delaware	B.'48,P.'51
55.	QUATTLEBAUM, J. H. - Chem. Engr., Pennsgrove, New Jersey	B.M.'48,P.'50
56.	DEWEY, DONALD C., Sr. Service Engr., Eng. Dept., Parlin, N. J.	M.'48,D.'51
57.	GEORGE, DAVID - Sales Training Specialist, Wilmington, Delaware	B. '48
58.	MAYFORTH, F. ROBERT - Textile Fibers Dept., Wilmington, Delaware	D. '48
59.	McINTIRE, LOUIS V., Chem. Engr., Orange, Texas	M.'48,D.'51
60.	DAWSON, GILBERT H., Chem. Engr., Film Dept., Circleville,Ohio	M.'48
61.	GIEBEL, C. E. (RETIRED) - 3411 Bradford Road, Cleve. Hts., Ohio	B. '07
62.	SHAW, JOSEPH C., Foreman, Kinston, N. C.	B. '49
63.	HARBOUR, ROBERT LEE - SALESMAN, Polychemicals Dept., Wil., Del.	B. '49
64.	MILLER, CECIL G.,Jr. - Res.Chem.Engr., Patomac River Lab., Explosives Dept., Gibbstown, New Jersey	B. '49
65.	MILLER, WILLIAM C. - Sr. Chem. Engr., Grasselli Dept.,Linden,N.J.	D. '49
66.	SIEBER, RALPH E. - Lab. Supervisor, Parkersberg, W. Va.	B. '50
67.	THOMPSON, ROBERT E., - Parlin, New Jersey	B. '50
68.	WINTERKAMP, FRED H.- Supv. of Instrument, Belle, West Virginia	B.M.'50
69.	ROSENBERGER, EARL C. - Foreman, Philadelphia, Pa.	B. '50
70.	KING, ROBERT J. - Tech. Rep. Sales Div., Wilmington, Del.	B. '50
71.	MAYFIELD, RAYMOND J. - Newburgh Lab., Fabric and Finishes Dept., Newburgh, New York	B. and M. '50
72.	LAURRELL, ROBERT W. - Chemist, Marshall Lab., Phila,Pa.	B.and M.'50
73.	SCHLOSSER, JOHN J. - Material Control Dept., PennsGrove, N.J.	B. '51
74.	SHARPS, DAVIS L., Proc. Engr., Martinsville, Virginia	B.and M.'51
75.	SNELLING, GEOFFERY,Sales Polychemicals Dept.,Wilmington,Del.	B.'51,M.'52
76.	SPAITE, PAUL W. - Tech. Trainee, Sayreville, New Jersey	B. '51
77.	SPEED, DAVID B. - Cleveland, Ohio	B.'51,M.'51
78.	WEISER, ROBERT - Tech. Section Engr., Parkersburg, West Va.	B.'51,P.'52
79.	BREITHAUPT, C. E., Dev. Engr., Wanesboro, Virginia	B.'51 and M.'51
80.	GILES, BRUCE D. - Niagara Falls, New York	B'51,M'54,P.'56
81.	HARING, DAVID C., Jr. Engr., Electrochemicals Dept.,Niagara Falls	B.and M.'51
82.	GARMUS, WILLIAM J. - Ass't. Dept. Supv., Graselli, Cleveland, Ohio	B.and M.'51
83.	MAPLE, DONALD E., Group Supv., Martinsville, Virginia	B.and M.'51
84.	MARTIN, BERNARD L. - Polychemicals Dept., Expt. Sta.,Wilmington,Del	B.'51
85.	NARWOOD, RICHARD H. - Nylon Div., Seaford, Delaware	B.and M. '51
86.	RUMMEL, FRANK, Jr. Engr., Electromet, Niagara Falls, New York	B. '52
87.	SCHLEA, CARL - Explosive Div., Savannah River Plant, Augusta, Ga.	B'52,M'52,P'55
88.	BAKER, JERRY R.- Supv., Acid Dept., Barksdale, Wisconsin	B'52
89.	TEMPLE, CLARK - Chem. Engr., Savannah River Project, Aiken, S.C.	B.andM.'52
90.	SASHIHARA, THOMAS F. - Polychemicals Dept., Wilmington, Del.	B'53,M'53,P'57
91.	BOWERS, DONALD L. - Polychemicals Dept., Parkersburg, W. Va.	B.'53
92.	SPROUT, WILLIAM H. - Film Dept., Circleville, Ohio	B. and M.'54
93.	GARTNER, DAVID H. - Beaumont Works, Beaumont, Texas	B. '54
94.	THACKER, CHARLES C. Jr. - Polychem. Dept., Parkersburg, W. Va.	B.and M.'54
95.	SIMKO, FRANK A., Grasselli Expt. Sta., Wilmington, Del.	B. '55
96.	WEAVER, KEITH R., Chem. Engr., Aiken, South Carolina	B. '55
97.	CUBRE, CARROLL - Polychemicals Dept., Orange, Texas	B.'55,M.'56
98.	CROWE, DENZIL H.,Jr. - Polychemicals Dept., Orange, Texas	B.'55
99.	FANNING, HERBERT H.- Engr. Tech. Section, Film Dept., Circleville,O	M. '56
100.	ROWAND, RONALD P. - Engr.Tech.Section,Polychem.Dept.,Parkersburg,	B.andM.'57
101.	ANDREWS, WALTER R.Jr. - Parkersburg, West Virginia	B. '57

No.102 to 106 given on page 56.

B. F. GOODRICH CO.

B. F. Goodrich Chemical Division

		DEGREE and YEAR
1.	WARNER, HARRY B., Vice President, Chemicals Development	B.'38,M'39
2.	STELLER, ROGER LEE, Sales Rep., Boxton, Mass.	B.'40,M'42
3.	WENDSCHUH, WALTER C., Plant Engr., Akron, Ohio	B.'40
4.	LODGE, WALTER S., Sr. Rep. (Sales) Los Angeles, California	B.'43
5.	SCHROEDER, ELMER F., Dev.Engr., Cleveland, Ohio	B.'43
6.	WHITMIRE, PAUL T., Dept. Mgr., Hycar Rubber, Plant #3, Akron,Ohio	B.'43
7.	MENDIOLA, JOHN N., Foreman, Barberton, Ohio	B.'43
8.	HETLER, MAURICE R., Plant #3, Akron, Ohio	B.'49
9.	SCHAAF, GLEN DALE, Sr. Tech. Man, Welland, Ontario, Canada	B.'49
10.	WILSON, DAVID W., Technical Man, Walker Road, Expt.Sta.,Avon Lake,O	B.'50
11.	WEISZ, LOUID - Dev. Eng., Avon Lake, Ohio	B.'50
12.	KREAGER, R. M. - Dev. Engr., Avon Lake, Ohio	B.and M.'51
13.	CARROLL, ROBERT F., Dev. Chem. Engr., Avon Lake, Ohio	B.and M.'51
14.	MASSE, ARTHUR N., Chem. Engr., Calvert City, Ky.	B.'51
15.	NOLL, RAYMOND - Chem. Engr., Avon Lake, Ohio	B.'52
16.	SATAVA, RICHARD - Dev. Engr., Avon Lake, Ohio	B.'52
17.	HAEHN, JAMES - Tech. Man, Avon Lake, Ohio	B.'52
18.	FLEMING, CARL E., Dev. Engr., Avon Lake, Ohio	B.'53,M'55
19.	WEISEL, JOHN, Jr. Technical Man, Akron, Ohio	B'53,M'56
20.	KUMLER, PAUL R. - Proc. Dev., Avon Lake, Ohio	B'53,M'53
21.	ELENISS, CHRIS C. - Engr., Exp. Station, Avon Lake, Ohio	B'53
22.	WOOTTON, GERALD V. - Development Engr., Avon Lake, Ohio	B'43
23.	LOTT, JOHN O. - Chem. Engr., Avon Lake, Ohio	B'54
24.	TAWNEY, MARK - Chemical Engineer, Henry, Illinois	B'58
44.	Palkovic, John. Chemical Co., Louuiseville, Ky.	B'52
45.	Massie, Arthur N.Chemical Company,Calvert City Ky.	B'51
46	Wilson David Chemical Co., Avon Lake	B'50

B. F. Goodrich Research Center

25.	FRITZ, HOWARD E. - Vice-President, Research, Brecksville (RETIRED)	B'13,M'14 P'23,C'23
26.	JUVE, ARTHUR E. - Director, Tech.Sales Research, Brecksville,Ohio	B'25
27.	BOLLINGER, E. H. - Sr. Tech., Research Center, Brecksville, Ohio	B'49,M'49,P'58
43.	ERNSTEIN, N. - Chem. Engr., Brecksville, Ohio	Withdrew

Tire Division

28.	FRITZ, ROD D. - (DECEASED) - Akron, Ohio	B.'14
29.	RITCHIE, CLARENCE H., Mgr., Process Tech., Akron, Ohio	B.'23
30.	EFFLER, CARL F., Tech. Mgr., Akron, Ohio	B.'43
31.	KUHLMAN, ARTHUR H., Textile Dev., Akron, Ohio	M.'47
32.	THOMPSON, GILBERT, Mgr., Factory Service, Akron, Ohio	B.'31
33.	WILSON, MYRON I. - Technical Man, Akron, Ohio	M.'48
34.	WALKER, DONALD E., Sales Representative, Harman Colors Div.,Chicago,	B.'48
35.	HETLER, MAURICE R., Technical Man,Chem.Co.,Plant 3, Akron,Ohio	B.'49
36.	ABDERHALDEN, GEORGE E., Chem. Engr., Akron, Ohio	B.'51
37.	COFFEY, RICHARD J., Chem. Engr., Avon Lake, Ohio	B.'51

B. F. GOODRICH CO.

DEGREE

GOODRICH GULF CHEMICALS

38. BURT, WILLIAM I. - Chairman of the Board, Cleveland, Ohio B.'17

AMERICAN ANODE DIVISION

39. CAMERON, WILLIAM H. - Quality Control and Latex Dept., Akron, Ohio B.'43
40. GRAVES, THURMAN L., Tech. Rep., Los Angeles 22, California M.'47

PLASTICS DIVISION

41. HABERCOST, DEAN F., Plastics Division, Cleveland, Ohio B.'43
42. VELEY, FLOYD ARTHUR - Product Engr., Box 405, Marion, Ohio B.'54

ACE RUBBER COMPANY

1. REUBEN, HAROLD - Chief Chemist, Akron, Ohio B.'41

AMERICAN SYNTHETIC RUBBER COMPANY

1. STUCKER, RICHARD O. - Chem. Engr., Louisville, Kentucky B.'48

DeLURIK SHOWER COMPANY

1. SHULL, DALE B. - Rubber Dept. Head, Sartell, Minn. B.'48

MacGREGOR GOLF and SHORTS PRODUCTS INC.

1. LUNDGREN, CARL - Supt., Rubber and Golf ball Depts., Cincinnati, O. B.'32, M.'32

MANSFIELD TIRE and RUBBER COMPANY

1. LISLE, HARVEY C. - Dev. Engr., Mansfield, Ohio B.'37

OHIO RUBBER COMPANY

1. SVOBODA, CLARENCE J. - Rubber Compounder, Cleveland, Ohio B.'51

SPONGE RUBBER CORPORATION OF AMERICA

1. RITZERT, RAYMOND K. - Chief Chemist, Marietta, Ohio B.'43

TIRE REDUCING CORPORATION

1. STROUSE, DORAN R. - Prod. Mgr., Wallington, New Jersey B.'42

O'SULLIVAN RUBBER CORPORATION

1. ROW, STUART B. - Tech. Director, Winchester, Virginia D.'40

PARA RUBBER COMPANY

1. LEVIN, LOUIS E. - Chem. Engr., Toledo, Ohio B.'33

PYRAMID RUBBER COMPANY

1. PORTHOUSE, CYRIL R. - President, Ravenna, Ohio B.'32, M'33

GARDNER BOARD AND CARTON COMPANY

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	WRIGHT, HAROLD E. - Vice President Sales, Middletown, Ohio	B.'28 C.'33
2.	BOGGS, RICHARD L. - Ch. Engr., Middletown, Ohio	B.'54

IMPERIAL PAPER AND COLOR COMPANY

1. GOBLE, RICHARD B. - Dist. Mgr., Cincinnati, Ohio B.'28

MORAINE PAPER COMPANY

1. MARTIN, WILLIAM C. - Tech. Dir., West Carrollton, Ohio B.'43

NATIONAL NEWSPRINT AND PAPER MILLS

1. MAJMUDAR, SANATKUMERS - Grolindwood Mill Supt., Nepanagar, MP, India M.'50

OHIO BOXBOARD COMPANY

1. HIGGINS, JAMES J. - Res. and Dev. Mgr., Rittman, Ohio B.'42 M.'48
2. McCAMMON, ROBERT G. - Rittman, Ohio B.'48

OXFORD PAPER COMPANY

1. HOGE, WILLIAM H. - Group Leader of Technical Specialties B.'49

RAYONIER, INCORPORATED

1. ROTH, CHARLES E. - B.'32 M.'34

SARG PAPER COMPANY

1. HEIL, C. RICHARD - Trainee, Middletown, Ohio B.'52

ST. REGIS PAPER COMPANY

1. SUTER, PAUL L. - Power Engr., Printing Paper Plant, Sartell, Minn. M.'39

UNION BAG AND PAPER COMPANY

1. BECKETT, RAYMOND C. - Process Engr., Savannah, Ga. B.'51
2. MC CUE, ELDON, - Ch. Engr., Savannah, Ga. B.'52

WEST VIRGINIA PULP AND PAPER COMPANY

1. VERROSS, WILLIAM T. - Supt. Pulp Mill, Covington, Va. B.'43
2. WHITE, EDWARD E. - Covington, Va. B.'43
3. BYERLY, JAMES W. - Research Project Leader, Covington, Va. M.'47
4. HAMMOND, WENDELL B. JR. - Covington, Va. B.'55
5. WISEMAN, WILLIAM - Research Engr., Covington, Va. B.'53
6. GOSSARD, HARRY F. - Chem. Engr., Covington, Va. B.'51

WEYERHAEUSER TIMBER COMPANY

1. MC EWEN, JOHN M. - Tech. Director, Everett, Washington B.'39

B=Bachelor; M=Master; P=Ph.D.; C=Professional

PAINT AND VARNISH COMPANIES

GLIDDEN COMPANY

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	SPRAGUE, PAUL E. - Vice President	B.'14 M.'15
2.	MUTERSBAUGH, GORDON H. - Supt., Cleveland, Ohio	B.'23
3.	THRONE, CLAIR O. - Varnish & Resis. Res., Cleveland, Ohio	B.'31 M.'32
4.	MILES, HERBERT E. - Regional Dir., Nubian Paint & Varnish Div., Chicago, Ill.	B.'37
5.	ZIER, JOHN ALBERT - 1101 Madison, Cleveland 2, Ohio	B.'41
6.	TURNBULL, EDWARD D. - Euston Lead Div., Scranton, Pa.	B.'23 C.'42
	SHERWIN-WILLIAMS COMPANY	
1.	REBUCK, RALPH R. - Paint Formulator, Cleveland, Ohio	B.'23
2.	BEYNON, NATHAN T. - Group Leader, Cleveland, Ohio	B.'25
3.	EYSENBACH, JOHN W. - Chicago, Ill.	M.'35
4.	OLAH, JOHN A. - Chem. Engr., Chicago, Ill.	B.'50
	ST. JOSEPH LEAD COMPANY	
1.	CROSSLEY, ROBERT - Manager, Zinc Oxide Sales, N.Y.C., N.Y.	B.'34
	ACHESON DISPERSED PIGMENT COMPANY	
1.	JONES, M.E., JR. - Orange, Texas	B.'49
	CINCINNATI VARNISH COMPANY	
1.	ALEXANDER, DON F. (Deceased) - Cincinnati, Ohio	B.'17
	DEPENDABLE HARRIS PAINTS	
1.	MILLER, HAROLD H. - West Canton, Ohio	B.'23
	EAGLE-PICHER COMPANY	
1.	SOHN, ERWIN - (Deceased) Joplin, Mo.	B.'09
	FITZPATRICK BROTHERS INCORPORATED	
1.	MAPEL, LOUIS H. - Prod. Mgr., Chicago 8, Ill.	B.'29
	HANNA INDUSTRIAL FINISHES COMPANY	
1.	FENBURR, HERBERT L. - Columbus, Ohio	B.'34 M.'35 P.'36
2.	ARCHER, ROBERT WILLIAM - Salesman, Chattanooga, Tenn.	B.'41
	HILTON-DAVIS CHEMICAL COMPANY	
1.	SPRINKEL, K. M. - (Deceased) Engineer, Cincinnati, Ohio	B.'30
2.	MILES, WILLIAM - Dye Div., Prod. Supvr., Cincinnati, Ohio	B.'34
	INTERCHEMICAL CORPORATION	
1.	MEHNERT, WARREN E. - Tech. Mgr., Cincinnati, Ohio	B.'31
	LACQUER PRODUCTS, INCORPORATED	
1.	HASSLER, CLARENCE - President, 9D Kinsman Rd., Cleveland, Ohio	B.'21
	LILLY VARNISH COMPANY	
1.	KIRKPATRICK, WALTER L. - Supt., Indianapolis, Indiana	B.'23
	O'BRIEN CORPORATION	
1.	MAPEL, LAURENCE C. - Chief Chemist, South Bend 21, Indiana	B.'23
	FREY YENKIN PAINT COMPANY	
1.	YENKIN, FRED - Prod. Mgr., Columbus, Ohio	B.'34
	DE VOE AND REYNOLDS COMPANY	
1.	KLASSEN, HAROLD C. - Sales Mgr., Jones-Dabney Div.	B.'35 M.'47
2.	DUNHAM, LE ROY A. - Louisville, Ky.	B.'47
	FEDDERS-QUIGAN CORPORATION	
1.	LEE, LE FEVER M. - Dir. Ind. Engr., 58-01 Grand Ave., Maspeth, LI,NY.	B.'31 M.32
	FARBOIL PAINT COMPANY	
1.	LONSWAY, WILLIAM L. - Baltimore, Md.	B.'23
	HAMPTON PAINT MFG. COMPANY	
1.	LIEVERMAN, ARTHUR R. - Owner, Hampton, Va.	B.'42
	WOOSTER FINISHES CORPORATION	
1.	ANDERSON, EARL G. - Wooster, Ohio	B.'41

B=Bachelor; M=Master; P=Ph.D.; C=Professional

INSURANCE AND RELATED

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR

NATIONAL BOARD OF FIRE UNDERWRITERS

1. VAN ARNUM, WILLIAM HAROLD - Oil and Gas Engr., 85 John St.,N.Y.C.38, N.Y. B.'42
2. BRAIDECH, MATHEW M. - Research Dir., 85 John St., N.Y.C., 38, N.Y. B.'25 C.'31

FIREMAN'S FUND INSURANCE COMPANY

1. HOLM, PERRY O. - State Agent, Rocky River, Ohio B.'28

HARTFORD FIRE INSURANCE COMPANY

1. BEEBE, PHILLIP S. - Asst. Mgr., Wilmette, Illinois B.'10

CONNECTICUT MUTUAL LIFE INSURANCE COMPANY

1. MEYER, GEORGE L. - District Agent, Marietta, Ohio M.'33

CONRAD AND MUELLER, INCORPORATED

1. MUELLER, JEROME B. - Insurance Agent, Canton, Ohio M.'21

EMPLOYERS' MUTUAL LIABILITY INSURANCE COMPANY

1. MEITER, EDWARD G. - Director, Industrial Hygiene Div. B.'20 M.'21 P.'23

FACTORY INSURANCE ASSOCIATION

1. ARTHUR, WILLIAM D. - Field Engr., Columbus, Ohio B.'49
2. SPENCER, ROLAND I. - Chem. Engr., Chicago 4, Ill. B.'49

AMERICAN INSURANCE COMPANY

1. EAGLE, C. F. - Field Supvr., Dayton, Ohio B.'27

EQUITABLE LIFE INSURANCE COMPANY

1. FOSTER, GEORGE O. - 45 Orchard Rd., Piqua, Ohio B.'21

INSURANCE COMPANY OF AMERICA

1. BAKER, WARREN J., JR. - Chief Engr., Philadelphia, Pa. B.'22

MANUFACTURERS MUTUAL FIRE INSURANCE COMPANY

1. BERZY, NICHOLAS - Dist. Mgr., Cleveland, Ohio B.'39

MUTUAL INSURANCE COMPANY

1. COVER, KLAHR A. - Associated Factory, Tampa 6, Florida B.'22

NORTH BRITISH AND MERCANTILE INSURANCE COMPANY

1. BAKER, M. B., JR. - Asst. U.S. Mgr. and Vice Pres., N.Y.C., N.Y. B.'41

NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY

1. RUDMANN, CHARLES F. - Hanna Bldg., Cleveland, Ohio P.'21
2. CANFIELD, LEE B. - Life Underwriter, Chicago, Ill. B.'49

HOME INSURANCE COMPANY

1. KREIGER, W.M. - Vice Pres., 59 Maiden Lane, N.Y.C., 8, N.Y. B.'19

STANDARD OIL COMPANY OF NEW JERSEY

ESSO STANDARD OIL AND ESSO RESEARCH AND ENGINEERING

NO.	NAME AND POSITION IF KNOWN / DIVISION, SUBSIDIARY or DEPARTMENT	DEGREE AND YEAR
1.	GRAHAM, JOHN D. - Supv. Mech. Dept., Linden, New Jersey	B.'37
2.	TOBIAS, GEORGE S. - Asst. Director, Esso Products Research	B'38,M'39
3.	THOMPSON, ROY W. - Head, Prosess Engr. Div., Bayway Refinery,Linden,	B'39
4.	HAVERLY, CLARENCE, Planning Engr. Div., Linden, New Jersey	B'44,M'48
5.	CAHN, ROBERT - Chemical Engineer,Esso Development, Elizabeth, N.J.	M'47
6.	FEIL, WILLIAM K. - Process Div., Std.Oil Dev.Co., Linden, N. J.	B'47,M'48
7.	SWISHER,ROBERT H. - Chem. Engr., Linden, New Jersey	B'50
8.	GREEN, TOBERT C. - Chem. Engr., Linden, New Jersey	B'53,M'57
9.	FERGUSON, JAMES - Esso Research, Linden, New Jersey	M'55
10.	COX, ROGER W., HUMBLE OIL CO., Houston, Texas	B. & M.'57
11.	THROCKMORTON, R. D. - Chemical Engineer, Baton Rouge, Louisiana	B. & M.'57
12.	VETTER, FRANK W. - Esso Research Labs., Baton Rouge, Louisiana	B. & M.'57
13.	TAYLOR, WILLIAM F. - Esso Res. and Eng., Rahway, New Jersey	M. '57
14.	TURNER, JOHN - Chemical Engineer, Linden, New Jersey	B.and M'58
15.	ASHER, WILLIAM - Chemical Engineer, Linden, New Jersey	M. '58
16.	Thomas, Charles-Chem.Engr. Linden, N.J. (Now in Navy)	B and M'55
	HUMBLE OIL AND REFINING	
17.	DUMBOULD, GEORGE - Res. Engr., Houston, Texas	B.'34
18.	COX, ROGER - Res. Engr., Houston, Texas	B.'57
	ENJAY CO., INC., NEW YORK, NEW YORK	
19.	BAUM, ALAN W. - Tech. Service Coordinator, New York, New York	M.'47

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY OR DEPT.	DEGREE AND YEAR
	SOCONY MOBIL AND SOCONY VACUUM OIL COMPANY	
1.	WRASMANN, GEORGE J. - Production Manager, Socony Paint, Metucken,N.J.	B.'21
2.	CARR, EDWIN B. - Lubrication Engr., (Ind.Dept.), Chicago, Illinois	B.'30
3.	POWELL, DONALD E. - Chem. Engr., Socony Vacuum, Trenton, Michigan	M.'38
4.	MILLER, DANIEL M. - Chemist, Trenton, Michigan	B.'38
5.	REEVES, PRENTICE W. - Sr. Engr. MAP Mfg. Dept., Norwalk, Connecticut	B'38
6.	QUIGLEY, RALPH E. - Tech. Asst., Trenton, Michigan	B.'39
7.	NELSON, FREDERICK L. - Asst. Coordinator Fuels, New York, New York	B.'41
8.	HUDNALL, JERRY R. - Project Engr., Research and Dev.,Paulsburro,N.Y.	B.'42
9.	WHITE, ERNEST T. - Socony-Vacuum Oil Co., Brooklyn, New York	B.'42
10.	LANGE, ROBERT - Chem. Engr., Woodbury, New Jersey	B.'43
11.	GOPALAN, V. S. - Chemical Engineer	M.'47
12.	BONDURANT, MAURICE E. - Eng. Chem. Prod., Baltimore 22, Maryland	M.'48
	SKELLY OIL COMPANY	
1.	MCGEE, A. ERNEST - Skelly Oil Co., Kansas City 41, Missouri	P.'25
2.	CHAMBERS, HARRY E. - Refinery Process Engr., Skelly Oil Co., El Dorado, Kansas	B.'28

B=Bachelor; M=Master; P=Ph.D.; C=Professional

SOHIO CHEMICAL COMPANY

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	STEWART, JACK - Proc. Engr., Lima, Ohio		B. '48
2.	ARNOLD, RICHARD A., Market Analyst, Lima, Ohio		B. '48
3.	FACER, JAMES - Chem. Engr., Lima, Ohio		B. '58
4.	CROSS, GORDON G., Hd. of Sales, Lima, Ohio		B. '49

STANDARD OIL OF OHIO

5.	SMOOTS, JOHN P. (RETIRED) Vice-President, Cleveland, Ohio		B. '14
6.	MERSEREAU, HAROLD E.- Chief Plant Chemist, Toledo Refinery, Toledo, O.		B. '16
7.	MAY, PAUL L., Sr. Asst., Process Engr., Covington, Kentucky		B. '23
8.	COLLINS, JAMES L. - Operations Control Asst. to Gen'l Supt. Toledo, O.		B. '27
9.	McDANIEL, KENNETH A., Gen'l. Supt., #1 Refinery, Cleveland, Ohio		B. '35
10.	ARMSTRONG, ROBERT S., Chem. Engr., Lima, Ohio		M. '38
11.	ROBERTS, DONALD R., Sr. Proj Engr., Toledo 1, Ohio		B. '49
12.	GRIMES, WILLIAM W., Sr. Engr., Cleveland 15, Ohio		B. '50
13.	CONNELLY, JOHN - Chem. Engr., Lima, Ohio		B. '58

STANDARD OIL OF INDIANA

1.	VAN DOREN, HAROLD - Lubricating Sales Engr., Whiting, Indiana		B. '20
2.	STAEUBLE, IRVIN C. - Supt. Process Div., Sugar Creek, Missouri		B. '22
3.	DONHAM, R. T. (DECEASED) Supv. of Grease Analysis, Whiting, Ind.		B. '23
4.	NEUNHERZ, ELLIS - Project Chem. Engr., Whiting, Indiana		M. '36
5.	KENNEDY, DON E. - Res. Lab., Whiting, Indiana		B. '40
6.	FORBES, W. - Chem. Engr., Whiting, Indiana		B. '42
7.	GIFFORD, GLENN L. - Supt., Chem. Div., Wood River, Illinois		B. '43
8.	KRANE, HERBERT - Whiting Research Labs.		B. '47
9.	GERLACH, JOHN G. - Chem. Engr., Whiting, Indiana		B. and M'48
10.	PLAUTZ, DONALD A., Chem. Engr., Whiting, Indiana		M. '50
11.	RUSCILLI, ALBERT - Ass't. Gen. Foreman, Alton, Illinois		B. and M'52
12.	SCHMITZ, CHARLES - Chem. Engr., Chicago, Illinois		B. and M'52
13.	WILSON, JAMES L. - Ass't. Proj. Chem. Engr., Whiting, Indiana		M. '53
14.	MacDOUGAL, DONALD A. - Chem. Engr., Whiting, Indiana		B. and M'53
15.	DUDLEY, RICHARD E. - Chem. Engr., Whiting, Indiana		B. and M'54
16.	HULL, GLENN R. - Gen'l. Forman, Utilities Div., Whiting, Indiana		B'24, PE'39
17.	MacLAREN, FREDERICK H. - (DECEASED '53) WAX & ASPHALT RES., Whiting, Ind.		B'25
18.	ELLIOTT, ROBERT E. Sales Rep. (Amoco Chemical Corp.) Chicago, Ill.		B. '23
19.	BALDNER, ROBERT - (Amoco Chemical Corp) Std. of Indiana		B. '43

STANDARD OIL OF CALIFORNIA and CALIFORNIA RESEARCH CORP.

Standard Oil of California

1.	ARMSTRONG, JOHN B. - Test Engr., Nat. Gasoline Dept., Taft, Calif.		B. '37
2.	FOSDICK, L. B. - Ind. Hygiene Engr., San Francisco, California		B. '48
3.	VANARNUM, KENNETH J. - Prod. Devel. Rep. Oronite Chem. Div., N.Y. 20, N.Y.		B. '42

California Research Corporation

3.	MITCHELL, RICHARD J. - Res. Engr., Richmond, California		B'40, M'41
4.	KNOWLTON, HAROLD E. - Res. Engr., Richmond, California		M'47, P'50
5.	FITZ, RICHARD A. - Assoc. Res. Engr., Richmond 1, California		M'51, P'56

STANOLIND-(ELLINWOOD, KANSAS)

1.	LENHART, PAUL H. - Stanolind, Ellinwood, Kansas		B. '47

B=Bachelor; M=Masters; P=Ph.D.; C=Professional

OLIN MATHIESON CHEMICAL COMPANY

NO.	NAME AND POSITION IF KNOWN — DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
26	Celli, F.J. Research Fdn., Columbus O	B'45 Ph.D'53
1.	CLARK, C. C. - Mgr., Univ. Res., Alkali, Niagara Falls, N.Y.	B'24,M'29,P'31
2.	HERNDON, LYLE K., Vice President, Dir. of Research, New York 22, NY	B'29,M'31,P'38
3.	JOHNSTON, ROBERT C., Tech.Service Dept., Niagara Falls, New York	B'31,M'50
4.	KAUFMAN, H.D., Mgr. Engr. Est. and Design, Niagara Falls, N.Y.	B.'34
5.	SIMERL, LINTON E., Chief, Devel. Section, Research and Dev. Dept.	B'35,M'37,P'39
6.	ROSE, AARON, Manager, Process Devel.,High Energy Fuels	B'40,M'46,P'49
7.	IRELAND, JOHN D., Ass't. Dept. Mgr., Eng.Planning Div.,Niagara Falls	B'41
8.	BAILEY, RANDAL - Distillation Lab. Supervisor, Niagara Falls,N.Y.	B'42
9.	MORNINGSTAR, R. W. - Pilot Plant Mgr., Niagara Falls, New York	B'42,P'52
10.	RICCARDI, SAMUEL A. - Chem. Engr., Niagara Falls, New York	B'42,M'47,P'49
11.	WOLFE, WADE - Process Engr., Niagara Falls, New York	B'43,M'47,P'51
12.	MORGAN, DONALD E., Chief Proc. Engr., Huntsville, Alabama	B'43
13.	MILLER, MYRL E., Mgr., Process Development, Mathieson Chem,Baltimore	B'43,M'44,P'48
14.	HARSHMAN, RICHARD C., Sr. Res. Engr., Niagara Falls, New York	B'47,M'49,P'51
15.	BETTS, VICTOR - Alkali Works, Niagara Falls, New York	M'47
16.	HUNTER, WALTER D., - Patent Supv., Niagara Fall, New York	M'47,P'49
17.	CHAFLIN, HARRY C., Res. Coordinator, Niagara Falls, New York	M'48,P'51
18.	WARNER, RICHARD E., Pilot Plant Section Head, Niagara Falls, N.Y.	M'48,P'51
19.	STEELE, HOWARD R., Proc. Engr., Brandenburg, Kentucky	B'49
20.	HILL, BRUCE E., Res. Eng'r., Niagara Falls, New York	M'49,P'51
21.	KNAUS, RUDOLPH - Niagara Falls, New York	B and M'49
22.	CLICK, CLIFFORD N., - Chem. Engr., Niagara Falls, New York	B.'57
23.	SCHULZ, ARTHUR C., - Chem. Engr., Niagara Falls, New York	M.'58
24.	McLAIN, CHARLES D. - Western Brass Mills Div., East Alton, Ill.	B.'40
25.	WING, KENNARD L. - Olin Mathieson, Alabama Chem.Corp., McIntosh,Ala	B.'45,P.'51

ETHYL CORPORATION

1.	KRIEG, LEWIS R. - Ass't. Director, Patent Section, Baton Rouge,La.	B.'39,M.'41
2.	HILL, JOHN R. - Eng'r. Economist, Baton Rouge, La.	B.'48,M.'50
3.	MUELLER, JOHN D. - Chem. Engr., Baton Rouge, La.	M.'49
4.	DONHAM, WALTER E. - Dev. Engr., Baton Rouge, La.	B.and M.'50 P.'53
5.	MENGERT, WILLIAM L. - Supv. Financial Control, R and E Dept., Baton Rouge, La.	B.and M.'51
6.	GEAMAN, JOHN R. - Patent Engr., Baton Rouge, La.	B.'52

COLGATE-PALMOLIVE CO.

1.	HEALD, ROBERT F. - Head of Pilot Plants, Jersey City, N.J.	B.'22,M'25,P'27

HEWITT SOAP CO., INC.

1.	ELSLAGER, THOMAS W. (DECEASED) Supt., Dayton,Ohio	B.'31
2.	O'ROARK, JAMES R. - Chem. Supv., Dayton,Ohio	B.'38

WERK SOAP COMPANY

1.	DOCK, HOWARD - President, Cincinnati, Ohio	B.'11
2.	HOTZ, JOHN LEWIS - Chem. Engr., Cincinnati, Ohio	B.'39

B=Bachelor; M=Master; P=Ph.D.; C=Professional

FIRESTONE TIRE AND RUBBER CO.

1. Thompson, Harry H. Chief Chemist, Sylos Div. Los Angles 54, Calif. B.'17
2. HOLLOWAY, Chemist, Akron, Ohio M'21 arts che
3. FORTZ, CHARLES W., Chem. Engr., Akron, Ohio B'23
4. HANDLEY, ERNEST T., Vice President, Fireston Plastics Company B'23.P43
5. MCCOLLISTER, ARMAND H., Tech. Coordinator, Akron, Ohio B.'24
6. CONN, MARION, Dev. Engr., Noblesville, Indiana B'31
7. HARPER, EDWIN, Chief Chemist, Noblesville, Ind. B'34
8. JONES, WARREN E., Mgr., Tech Sales, Synthetic Rubber Div= B'35
9. DUM, JOHN L, Dev, Chem., Los Angeles, California M'36
10. WOLF, BURTON M, Chem. Engr., Akron, Ohio B'38-M'39
11. MCCALL, CHESTER A., Rubber Chemist, Akron, Ohio B'38
12. STROBEL, EVERETT H., Mgr(?) Des Moines, Iowa B'40, M'41
13. LAVERY, THOMAS, Chem Engr, Akron, Ohio B'41, M'43
14. KRESS, KENNETH E., Anal REsearch, Akron, Ohio B'44
15. HOLL, DALE SHEETS, Detroit Michigan) B'48
16. PLOTTS, DEAN B., Res Proj Engineer, Akron, Ohio B'49
17. MILLER, ADOLPH, Plant Chemist Plant II, Akron, Ohio B'58

U. S. Rubber Company

1. HAUCK, FRED K. - Mgr. Tire Const., 6600 E. Jefferson, Detroit, Mich. B.'12
2. CASKEY, JOHN - Vice-President, New York, New York (RETIRED) B.'15 (Chem.)
3. MUELLER, ROBERT E. - Rubber Chemist, Detroit, Michigan B.'20
4. FOLTZ, ROBERT R. - Gen. Foreman (Chemicals) Naugatuck, Connecticut B.'39
5. SCHEIBER, ROBERT E. - Gen. Foreman (Chemicals) Naugatuck, Connecticut B.'39
6. RAMOS, MANUEL - Tire Const. Engr., Detroit, Michigan B.'48
7. RIDENOUR, WILLARD L. - Factory Mgr., Buffalo, New York B.'41
8. THOMAS, ARTHUR JR. - Naugatuck Chem. Div., Naugatuck, Connecticut B.'39, M.'41

DAYTON RUBBER COMPANY

1. MICHEL, WILLIAM J. - Regional Mgr., Los Angeles, California B.'29
2. NEWHOUSE, ALEXANDER - (DECEASED) - Chem. Engr., Waynesville, N.C. B.'38, M.'39
3. RADOW, ROBERT S. - Chem. Engr. - Dayton, Ohio B.'39, M.'39
4. GRUSHCOW, GABRIEL - Works Mgr., Canada Ltd., Toronto, Canada B.'43
5. MEYER, DANIEL A. - Rubber and Plastics Compounding, Dayton, Ohio B.'43

R.C.A. RUBBER COMPANY (ALSO ECLAT RUBBER CO.)

1. REISS, CLIFFORD E. - Chairman of Board, Akron, Ohio B.'15
2. REISS, RICHARD T. - Director-Pres.-Treasury B.'41

ACUSHNET PROCESS CO.

1. THOMPSON, OWEN - Tech. Sales, New Bedford, Mass. B.'25, M.'31

ANACONDA WIRE AND CABLE COMPANY

1. LING, TING HUNG - Res. Rubber Chemist, Marion, Ind. B.'39, M'49

BALDWIN RUBBER COMPANY

1. KVET, EDWARD J. - Vice President (Semi-Retired) Box 1556, Clearwater, Fla. B.'08
2. STROBEL, CLARENCE J. - (RETIRED) 4291 Gratiot Ave., Port Huron, Mich. B.'15

B-Bachelor; M-Master, P-Ph.D.; C-Professional

BATTELLE MEMORIAL INSTITUTE

1.	BEIDLER, EDWARD A., Senior Engineer, Columbus, Ohio	B.'27M'37,
2.	SLOWTER, E.E., Vice President	B.'34, M'35 p'39
3.	CLARK, RICHARD A., Columbus, Ohio	B.35,M38, P.'46
4.	SIMPSON, JAMES F., Columbus, Ohio	B.'35
5.	EWING, ROBERT A.	B.'36, M'37
6.	SCROGGS, ROBERT L. (DECEASED), Columbus, Ohio	B.'36
7.	DUCKWORTH, WINSTON H., Supervisor, Ceramic Division	B.'40
8.	NOWACKI, L.J., Asst. Chief, Organic Coatings, Columbus, Ohio	B.'40, M.'50
9.	BRADBURY, ELMER J., Columbus, Ohio	B.'42, M.'49
10.	DARBY, RALPH L., Adm Asst, Columbus, O	B.'42
11.	SECREST, ARTHUR C., Res. Engr., Columbus, Ohio	B'42, M'48
12.	JONES, LEWIS K., CHEMICAL ENG., Columbus, Ohio	B'42,M'48
13.	BENGSTON, RICHARD, CHem Economist, Columbus, Ohio	B'43,M'48
13.	BROWNING, MELVIN, Ind Research, Columbus, Ohio	B'43
14.	GURKLIS, JOHN A, Chem. Engr., Columbus, Ohio	B'43,M'47,P.'50
15.	LEMMON, ALEXIS W., Asst Chief, Columbus, Ohio	B'43
16.	WHITE, EARL, , 505 W. King Avenue, Columbus, Ohio	M'48
17.	VAN KLEECH, AUGUSTUS R., Columbus, Ohio	B.'43,M'49, P'54
18.	BEALE, LOUIS C., Asst.Supervisor	B.'43
19.	ALLEN, ROLAND L. (DECEASED)	B.45
20.	FOLEY, DENNIS O. Asst, Div Chief, Columbus, Ohio	B.'47,M'49,P'54
21.	KELL, ROBERT M., Principle Chem Engr.	B.;47,M'48
22.	BLACK DAVID G., Principle Chem Engr., Columbus, Ohio	B.'47
23.	WILSON, ROBERT Q. Manager, 46 Bryanston Street, London, Eng.	M.'47
24.	WATTS, Admiral A., Metallurgist, Columbus, Ohio	B.'48,M.'50,P'52
25.	FLOWLER, FRANCIS E., Columbus, Ohio	B.'48
26.	JUREVIC, WILLIAM G., Chem.Eng., Columbus, Ohio	B.49-M.'49
27.	MITCHELL, RALPH I., Principal Chem Engr., Columbus, Ohio	B.'49,M'50
28.	LYONS, CARL J. Res Eng'r, Columbus, Ohio	M.'50
29.	SABROFF, ALVIN M., Light Metals, Asst Chief, Columbus, Ohio	B.'50
30.	CHIPMAN, GEORGE D., Principle Chemist, Columbus, Ohio	B.'51
31.	SANTILLI, PAUL T., Res Engr., Columbus Ohio	B.'51, M'51
32.	MUELLER, WILLIAM J., Principal Chem. Engr., Columbus, Ohio	M.52
33.	FARRAR, DONALD, Project Leader, Maint, Res, Div., Columbus, O	B.'51
34.	VAN SISE, John W., JR., Chem Engineer, Columbus, Ohio	B.'53
35.	RAINES, GILBERT E.; Prin. Chem Engr. Columbus, Ohio	B.'54,M'54
36.	ROBERTS, JOHN W., proc, Dev. Columbus, Ohio	B.'54
37.	SCHAER, GLENN R., Res.Electrochem, Cols.Ohio	B.'55
38.	LOCK, LUTHER D., Res and Dev.	M.'56

SOUTH WESTERN RESEARCH INST.

1.	McKEE, HERBERT C. - Chem. Engr., San Antonio, Texas	M.'47,P.'49
2.	WARREN, FRANCIS A. - Chem. Engr., San Antonio 6, Texas	M.'49

MELLON INSTITUTE

1.	HUBBEL, DEAN S. - Research Engr., Pittsburgh, Pa.	B.'27,M.'28

H. H. ROBERTSON COMPANY

1.	GEPHART, PAUL D. - Mgr., Tech. Products Div., Pittsburgh, Pa.	B.'20
2.	YOUNG, J. H. - President, Farmers Bank Bldg., Pittsburgh, Pa.	P.'19

DENVER RESEARCH INSTITUTE

1.	NEVENS, THOMAS D. - Assoc.Res.Engr., U. of Denver	P.'50

GULF COAST RESEARCH LABS.

1.	BANKSTON, HERMAN J. - Bus. Mgr., Ocean Sorings, Miss.	B.'21

SHELL OIL COMPANY & CHEMICAL

SHELL OIL DIVISION

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY AND DEPARTMENT	DEGREE & YEAR
1.	BURGBACHER, JOHN A. - Dev. Engr., Houston, Texas	B'48,M'49
2.	CAMPBELL, H. R., JR. - Technologist, Wood River, Illinois	B'48
3.	McLEAN, THOMAS J. - Technologist, Anacortes, Washington	M.'48
4.	MacDOUGAL, F. A. - Chem. Engr., New Orleans, Louisiana	B'49,M'50
5.	GOLUB, LILLIAN LENA - Development, Houston, Texas	B'51,M'52,P'57
6.	MAAG, WILLIAM L. - Chem. Engr., Wood River, Illinois	M'53
7.	HORSBURGH, ARTHUR R. - Technologist, New York, New York	B.'48
	SHELL CHEMICAL DIVISION	
8.	WOODS, MITCHELL EDWARD - Ass't. Dept. Mgr., Box 211, Torrance, Calif.	B.'41
9.	OVERTON, WILLIAM O. - Chem. Engr., Chemical, Houston, Texas	B'50,M'51,P'55
10.	SOBALA, HENRY - Chem. Engr., Chemical, Houston, Texas	B.'51
11.	HAUPT, DONALD - Technologist, 50 W. 50th St., New York 20, N.Y.	B.'52
12.	SLYKER, RICHARD A. - Chem. Engr., Chemical, Deer Park, Texas	B.'52
13.	BEALS, RICHARD N. - Tech. Trainee, Shell Chemical, Deer Park, Texas	B.'53
14.	DAVIS, NORVAL P. - Technologist, Chemical - Denver	B.'54
15.	BODENHEIMER, JACK W. - Chem. Engr., Shell Chemical	B.'55
16.	STREET, SIDNEY W. - Tech. Corres., Cleveland, Ohio	B.'55
17.	BLUNDEN, JOHN R. - Chem. Engr., Shell Chemical, Redondo Beach, Calif.	B.and M'55

SHELL DEVELOPMENT DIVISION

18.	MILLIGAN, ROBERT T. - Engr., Shell Dev. Co., Emeryville, Calif.	P.'46
19.	GRIMMA, GALEN A., JR. - Chem. Engr., Shell Dev., Emeryville, Calif.	B.'56,M.'57
21.	**EVANS, H. D. - Supv., Shell Devel., Emeryville, California**	**B.'38**

PIPE LINE DIVISION

20.	HARVEY, ROBERT A. - Supt., Zionsville, Indiana	B.'40

UNION OIL COMPANY OF CALIFORNIA

1.	GRANDEY, LOREN F. - Supt., Refinery Operations, Oleum Refinery	B.'40
2.	PRICE, F. CHARLES - Dev. Engr., Wilmington, Calif.	B.'47 M.'48
3.	CARLISLE, ROBERT V. - Operations Engr., Staff and Supv. Wilmington, Cal.	B.'48
4.	REEG, CLOYD P. - Engr., Wilmington, Calif.	B.'48
5.	CONGELLIERE, ROBERT H. - Plant Engr., Research Center, Brea, Calif.	B&M.'51
6.	KOERNER, VANCE - Proc. Engr., Wilmington, Calif.	B&M.'52
	PONTIAC REFINING CORPORATION	
1.	AIKELE, CARL M. - Process Engr., Corpus Christi, Texas	M.'45
	PLANET OIL AND REFINING COMPANY	
1.	AIMEN, H. W. - Vice President, Oklahoma City, Okla.	B.'31
	RICHFIELD OIL CORPORATION	
1.	HENDRIX, LLOYD T. - Proc. Engr. Supt., Gas Dept., Bakers Field, Calif.	M.'48

B=Bachelor; M=Master; P=Ph.D.; C=Professional

U. S. STEEL CORPORATION

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	BAIN, EDGAR C. - Vice President, Pittsburgh, Pa. (RETIRED)		B.'12,M.'16,C'23
2.	SEYLER, H. W. - Asst. V.P., Coal Chem. Ops.,Pittsburgh, Pa.		B.'19
3.	ALLERITAIN, ROBERT H., Benzol Recovery, Nat'l Tube Co.,Lorain,O.		B.'26
4.	BORNHORST, PHILIP J. - Div. Supt., Clairton Works, Clairton,Pa.		B.'30
5.	COOPER, H. G. - Dist. Plant Supt., Clairton, Pennsylvania		B.'30,M.'31
6.	FISHER, CLARENCE N. - Lab. Foreman, Gary, Indiana		B.'34
7.	GILLOGLY, HARVEY C. - (DECEASED)		B. and M.'35
8.	CONAWAY, HARRY L., - Technologist, Applied Res.Lab,Monroeville,		B.'35,M.'36
9.	FELKNER, FRANK F., - Chem.Engr,Applied Res.Lab.;Monroeville,Pa.		B.'41
10.	JOHNSON, HUGO C. - Prod.Dev.Div.,Pittsburgh, Pa.		B.'46,M.'48
11.	DEESON, Andrew - Chem. Engr., Clairton Works, Clairton,Pa.		B.'48
12.	WELLS, PAUL - Process Engr.,Applied Res.Lab.,Monroeville,Pa.		M.'50

AMERICAN STEEL AND WIRE COMPANY (Division of U. S. Steel Corp.)

13. GREEN, WILLIAM, Chem. Engr., Cleveland 12, Ohio — B.'21
14. KAUFMAN, DELWIN - Plant Chemist, Cleveland 12, Ohio — B.'35,M.'36

NATIONAL TUBE (DIVISION OF U.S. STEEL CORPORATION

15. BARRES, WALTER - Chem.Engr., National Tube Div.,Lorain,Ohio — B.'34
16. INGERSOLL, GRANT - Chem. Engr., National Tube Div.,Lorain,Ohio — B.'57

CRUCIBLE STEEL COMPANY OF AMERICA

1. CLORAN, FRANCIS J. - Chief Chemist, Midland, Pennsylvania — B.'17

INTERLAKE IRON CORPORATION

1. THOMPSON, R. W. - President, Cleveland, Ohio — B.'21
2. WOODWARD, GAYLORD - Chem. Engr., Toledo, Ohio — B.'38
3. NICKLAUS, H. R. - Asst. Gen. Supt., Chicago 17, Illinois — B.'19

JONES LAUGHLIN

1. HOUCK, EARL HARRY - Safty Dept., Aliquippa, Pennsylvania — B.'23
2. HAMILTON, R. F. - Vice President, Coyahoga Valley, Railway Co. — B.'20

D=Bachelor; M=Master; P=Ph.D.; C=Professional

LUKENS STEEL COMPANY

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR

LUKENS STEEL CO.

1. MA, JU LUAN - Res. Supv., Coatesville, Pennsylvania M.'48,P.'50

REPUBLIC STEEL CORPORATION

1. SCHMIDT, R. H. - Metallurgist, Cleveland, Ohio B.'22
2. SPEER, PAUL S. - Chem.Engr., Youngstown,Ohio -Residence: 32 Nesbitt- Street, Poland, Ohio B.'23
3. HAZEL, JOHN J. - Chief Ceramic Engr., Cleveland, Ohio B.'30
4. LEWIS, CHARTES T. - Chief Lub. Engr., Cleveland, Ohio B.'34
5. BERG, ROBERT S., Drafting Dept., Warren, Ohio B.'39
6. CAMERON, JAMES R. - Res. Engr., Cleveland, Ohio B.'41,M.'43
7. WILLIAMS, JOSEPH O. - Metallurgist, Cleveland, Ohio B.'42
8. POURNARAS, GUST - Chem. Engr., Cleveland, Ohio B.'51
9. VOLZER, JOSEPH M. (DECEASED) Metallurgical Dept., Cleveland,Ohio B.'20
10. KINZER, WILLIAM K. - Dev. Engr., Cleveland, Ohio B.'49
11. FERGUSON, T. (DECEASED) - Truscon Steel Co., Cleveland, Ohio B.'51

WHEELING STEEL CORPORATION

1. GLASER, ROBERT A. - Chemist, Wheeling, West Virginia

WIERTON STEEL CO.

1. NEWBRANDER, STANLEY - Asst. Plant Manager, Wierton, West Virginia B.'23
2. JOHNSTON, SAMUEL - Tech. Director, Electrolyte Dept., Wierton, W.Va. B.'32

YOUNGSTOWN SHEET AND TUBE COMPANY

1. CHAMBERS, ALFRED A. (DECEASED) Chief Metallurgist, Youngstown,Ohio B.'14

INLAND STEEL CORPORATION

1. PORTER, FRANK R. - Head, Surface Treatment Sec., E. Chicago, Ill. B.'16
2. Koegle Stuart A.Asst Supt.Tin Plate Mill (RETIRED) E.Chicago B '20

KALSEY-HAYES COMPANY - (STEEL PRODUCTS ENGR. CO.)

1. LESLIE, RICHARD L. - Qual. Cont. Engr., Springfield, Ohio B.'51

MARION IRON AND METAL COMPANY, MARION, OHIO

1. DABICH, ROBERT - President, Marion, Ohio B.'47

PRESSED STEEL TANK CORPORATION

1. FRANCIS, DWIGHT A. - Lab. Supv., West Allis 14, Wisconsin B.'39

METAL AND THERMIT CORPORATION

1. JOHNSON, ROLLAND E. - Chem. Process - Chicago, Illinois B.'54

UNION CARBIDE CORPORATION

BAKELITE DIVISION

1. SEEDS, DONALD H., Plant Supt., Bakelite Division, Wyandotte, Michigan B.36
2. MOODY, GILBERT L., Proc. Engr., Bakelite Division, Marietta, Ohio B.'54

ELECTROMET DIVISION

3. HARRIS, DENVER, V., Chemical Engineer, DeVala, Ohio B.'51
4. MC CLELLAN, MELVIN L. Niagra Falls, N.Y. B.'57
5. JOHNSON, NEWTON H. , Production Engineer, B.'48
67. MEREDITH, WILLIAM - Chem. Engr., Marietta, Ohio B. '47

INTERNATIONAL CARBIDE

6. FULLGRABE, HENRY A., Engineer, Union Carbide Int. Houston, Texas B.'41
7. WIDMAN, JAMES F. GENERAL MANAGER, Chemicals Division, London B.'35
8. HEINTZELMAN, BERT S., International B.'43
9. BIJAWAT, HARISH C., Chem. Engr., Sales Exec., Calcutta India (Ltd) B.'43, M'45, P49
10. SEIFERT, RICHARD J., Chem. Engr., International, Houston, Texas B.'57
68. JASKOT, JOSEPH - Chemical Engineer, New York, New York M.'58

LINDE AIR PRODUCTS DIVISON

11. STERN, ALEXANDER, Linde Air Prod., Torawanda, New York B.'45M'48, p'52
12. AVERY, William Francis, Chem. Engr. Tonawanda, New York B.'55
13. ARRICK, C. DIXON - Chem. Engr., Tonawanda, New York B.'43
14. TRIBOLET, RALPH OWEN - 30 E. 42nd Street, New York 18, New York B.'43
33. WILLIAMS, ALFRED E. - Line, Tonawanda, New York B.'53

NATIONAL CARBON COMPANY

15. PRITZ, WESLEY B. (RETIRED), Vice President, 273 Sanford Ave. Palm Beach, Fla '09
16. RICHEY, W.A. (DECEASED) B'10, M'12
17. BOBAL, MICHAEL A., Asst. Dev. Mgr., Cleveland Ohio B'34, M'45, P'47
18. BLAND, GEORGE D., Plant Mgr. B.'23
19. CROSS, CHESTER B., Cleveland, Ohio M'37
20. WISE. JAMES, Chem. Engr., Cleveland, Ohio B.'57
21. TAYLOR, GORDON, Control Engr., Cleveland Ohio B.'52
22. WARD, CHARLES N. - Asst. District Works Mgr., Cleveland 1, Ohio B.'19
23. ZIND, FREDERIC F. - Prod. and Process Devel. Eng., Cleveland 1, Ohio B.'52
24. ATHEARN, LEE F. - Development Engr., Cleveland, Ohio B.'53

NUCLEAR DIVISION

25. CHASE, LAWRENCE H., Dev. Engr., Nuclear Division, Oak Ridge Tenn B.'41, M'49
26. BAILEY, EDWARD W., Dept Head, Quality Control, Oakridge Tenn. B.'44
27. KECKENMASTER, HERMAN P., Oak Rodge Tenn. B.'44
28. KOPROWSKI, T.E., Prod Dept, Area Supr., Nuclear Div, Oak Ridge, Tenn. B.'44
29. POWELL, EDWARD. W.m Nuclear Company, Paducah, Ky. B.'44

71. Wolfe R.J. NATIONAL CARBON COMPANY Cleveland Ohio. w'19

SILICONE DIVISION

30. HEWITT, ROBERT, T. JR , Asst Engr., Silicone Division, Sistersville W.va. B53
31. HEUSTER, PETER K. SILicone Div, Tonawanda, New York M'57

VISKING CORPORATION

66. UNDERWOOD, W. Fred - Research Director, 6733 W.65, Chicago 38, Ill. B.'25 M.'29
69. CRAVER, JOSEPH - Chem. Engr., Chicago, Illinois P.'30(Chem.) B.'51, M.'51

UNION CARBIDE CHEMICALS CO.

32. RIFE, H.M., Group-Leader, Proc. Dev. Lab. So Charles, W.Va. B,'31
33. LILLEY, ROBERT G., Dept Head, Vinylite Dept. S. Charles.W.V.a B.35,M'39
34. CREAGH, JOSEPH P., Chem Engr. So Chas.W.Va P.'36
35. FISCHER, CARL D., Agriculture chem Sales Mgr.,30E.42nd St. N.Y.,N.Y. B.'39
36. HARVEY, JOHN K. Asst. Supt So Charleston W.Va. B.'39,M'40
37. BUXTEN, EDGAR E., Inst Engr., So Charles W.Va. B.'43
38. RANDALL, JAMES R., Chem Engineer, Institute, W.Virginia B.'43
39. BEQUIN, VERNON C., Chem Engineer, So Charles, W.Va. B.'43
40. JOHNSON, WILLIAM, Dept, Head, So Charleston W.Va. B.'44
41. SPEITZ, CHARLES J. JR. (DECEASED) B.'45
42. ROBINSON, HAROLD L., Head Prod Dept. S. Charleston,W.Va. B.'48
43. HOFFMAN, RICHARD , Dept Head, Petrochemical Prod (Charleston,W.Va. B.'48
44. BOYER, JOSEPH D.,Chem and Resin Div. S Charleston,W.Va. B.& M.'51
45. SMITH, THEODORE R., Chem. Engineer, So Charleston W.Va. B.'53, M'54
46. BIGHOUSE, ROBERT L, Chem Engr., Design Group, S. Charles.W.Va. B.'53
47. FISHER, JOHN A., Chem Engr., Institute,W.Va. B.'53,M53
48. HOGE, JOHNH., Resear ch Eng., REsear ch Center, S. Charleston W.Va. B.'55
49. JONES, Allan E., NOW U.S. MARINES, S. Chas.W.Va. B.&M. 57
50. CANNON, EDWARD,J. Supv., Charleston, W.Va. B.'30
51. ABBOTT, RICHARD M., Pittsburgh, Pennsylvania [DECEASED] B.'37
52. ALBRIGHT, WILLIAM D., Chem. Engr. in Prod., So.Charleston,W.Va. B.'37
53. ELLIOTT, JAMES M, Engr., Charleston, W.Va. B.'41
54. WALTHER, RICHARD A.,Development Engr., 1516 Virginia St., Charleston W.Va. B.'43
55. MCGRIFF, HASKELL H., Dept Head, So Charleston W.Va. B.'46
56. LARCAMP, BILLY LEE, Design Engr.,So. Charleston W.Va. B.'47,M'48,P50
57. MCGINNIS, ROBART, Prod,Supv., Charleston, W.Va. B.'50
58. WALDEN, PHILLIP, Production Supervisor, Box 2831, Charleston W.Va. B.&M.52
59. CASTO, WILLIAM H. Production, Institute Plant, Charleston, W.Va. B.'53
60. ALTHOUSE, GLENN F., So Charleston,W.Va. B.&M.'56
61. VAN HYNING, NORMAN D., Asst Dept Head, S.Charleston 3.W.Va. B.51
62. WALTER, JOHN WILLIAM, Technical REpresentative, 41 Marietta St. Atlanta B'56
63. HAMILTON, THEODORE, Tech Rep. Charlotte, N.C. B'47
64. KROCK, AL - Chem. Engr., Charleston, West Virginia B.'58,M'58
65. MCADAM, EDWARD - Chem. Engr., Charleston, West Virginia M.'58
70. NANTZ, DAVID - Chem. Engr., South Charleston, West Virginia B.'55

POWER, UTILITIES AND RELATED INDUSTRIES

APPALACHIAN POWER COMPANY

1. ABELE, WILLIAM - Chem. Engr., Charleston, W. Va. B.'32

AMERICAN GAS ASSOCIATION LABORATORIES

1. CRAMER, RALPH E. - Chief Standardization Engr., Cleveland, Ohio B.'33

CINCINNATI GAS AND ELECTRIC COMPANY

1. GALLOWAY, EDWARD E. - Staff Engr., Cincinnati, Ohio B.'49

DUQUESNE LIGHT COMPANY

1. LOWER, WALTER A. - Chem. Lab. Supv., Pittsburgh, Pa. B.'30

DETROIT-EDISON COMPANY

1. MARCH, CLARENCE - Chem. Engr., Detroit, Michigan B.'22

EL PASO NATIONAL GAS COMPANY

1. SCHWARTZ, MAYER - Pet. Des. Engr., El Paso, Texas M.'44

EAST OHIO GAS COMPANY

1. CAMPBELL, THOMAS R. - Engineer, Cleveland, Ohio B.and M.'50

LACLEDE GAS COMPANY

1. KERSTETTER, HOWARD J. - Distribution Design Engr., St. Louis, Mo. B.'49

PACIFIC GAS AND ELECTRIC COMPANY

1. MONG, PAUL E., --Associate Engineer, San Francisco, California B'32,M.'33

B=Bachelor; M=Master; P=Ph.D.; C=Professional

ANCHOR HOCKING GLASS COMPANY

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	PROBBLE, ROGER D. - Physicist, Lancaster, Ohio	B.'35

AMERICAN OIL COMPANY (Pan American Refinery)

1.	SCHROETER, DONALD - Admn. Supvr., Texas City, Texas	B.'43, M.'47
2.	KOZEL, WILLIAM J. - Texas City, Texas	B.'54, M.'54
3.	COOK, RONALD F. - Texas City, Texas	B.'55

AMERICAN POTASH AND CHEMICAL CORPORATION

1.	DUNN, PARKER S. - Vice Pres.-Mfg. and Dir., Los Angeles, Calif.	B.'30
2.	CURTIS, HENRY S. - Plant Mgr., Henderson, Nevada	B.'33
3.	GARRETT, DONALD E. - Mgr. of Trona Research, Trona, California	M.'48, P.'50

ARMCO STEEL CORPORATION

1.	GIFFORD, CARL E. - Plant Metallurgist, Zanesville, Ohio	w.'17
2.	POAST, JOHN - Supt. Blast Furnace, Middletown, Ohio	B.'32
3.	BEALL, WAYNE F. - Jr. Research Engr., Middletown, Ohio	B.'40
4.	GRAFF, HART F. - Res. Engr., Middletown, Ohio	B.'43
5.	HATTEN, MAURICE E. - Res. Lab., Middletown, Ohio	B.'48
6.	BAKER, JOHN E. - Middletown, Ohio	M.'51

AMERICAN METER COMPANY

1.	KRAMER, DOUGLAS R. - Advertising Mgr.	B.'41

AMERICAN CREOSOTE COMPANY

1.	KUHLMAN, D. W. - Genl. Supt., Louisville, Kentucky	B.'39

AIR PRODUCTS, INCORPORATED

1.	LAITURI, JOHN - Proj. Engr., West Palm Beach, Florida	B.'44
2.	COST, JOSEPH - Chief Process Engr., Allentown, Pa.	B.'43

AMERICAN AGRICULTURAL CHEMICAL COMPANY

1.	VOGEL, EDWIN F. - Chief Chemist, 4600 West 140 St., Cleveland 4, Ohio	B. and M.'25

AMERICAN BITUMULS AND ASPHALT COMPANY

1.	EGELHOFF, JOHN E. - Co. Shift Foreman, Cincinnati 38, Ohio	B.'49
2.	BRODEUR, MEDRO - Asst. Refinery Engr., Cincinnati, Ohio	B.'52

B = Bachelor; M = Master; P = Ph.D.; C=Professional

DOW CHEMICAL COMPANY

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	WILLIAMS, WILLIAM H. - Production Mgr., Midland, Michigan		B. and M. '19 C. '41
2.	MacLAREN, M. D. - Supt., Lime Kilns, Freeport, Texas		B. '31
3.	McCLURG, R. S. - Plant Supt., Midland, Michigan		B. '35
4.	SHORKEY, ALBERT F. - General Supt., Caustic Dept., Texas Div.		M. '37
5.	WILSON, JOHN T., JR. - Proj. Leader, Freeport, Texas		B. and M. '38
6.	ANDERSON, RAYMOND - Chem. Engr., Midland, Michigan		M. '39
7.	WEBER, CLAYTON W. - Maint. and Engr. Supt., Saron Products, Midland, Michigan		B. '39 M. '40
8.	LAWLESS, ROBERT M. - Supt. of Economic Evaluation, Midland, Mich.		B. '40
9.	MARSHALL, CHARLES - Computation Lab., Midland, Michigan		B. and M'42, P'56
10.	RECHTIN, HARRY - Chem. Engr., Organics Dev., Midland, Mich.		B. '42
11.	STAEHLING, EDWARD C. - Chem. Engr., Midland, Michigan		B. '42, M. '46
12.	LINDSEY, ROLAND G. - Chem. Engr., Midland, Michigan		B. '51, M. '53
13.	WILKINSON, BRUCE W. - Chem. Engr., Midland, Michigan		B. and M'51, P'58
14.	BISHOP, JOHN V.B. - Chem. Engr., Midland, Michigan		B. '53
15.	BRIGGS, ROGER LEE - Proj. Leader, Midland, Michigan		B. and M'53
16.	KOCH, GEORGE E. - Prod., Midland, Michigan		B. and M. '53
17.	OUDRE, ROBERT R. - Engr. Lab Work, Freeport, Texas		B. '54, M. '55
18.	GOLDEN, CHARLES E. - Prod. Dev. Engr., Chlorine Dept., Freeport, Texas		B. '56, M. '56

DOW CORNING COMPANY

1.	FINDLAY, DONALD E., Prod. Dev., Midland, Michigan		B. '53
2.	ROWND, ROBERT M. - Process Engr., Midland, Michigan		B. '47

WYANDOTTE CHEMICAL COMPANY

1.	ALLEN, C. M. - (Deceased) Chemist	B. '24
2.	QUIGLEY, HAROLD W. - Plant Mgr., North Plant	B. '32 M. '38
3.	SEBENICK, JOHN - Group Leader	B. '41 M. '44 P. '49
? 4.	BACAINTAN, NICOLAE N. - Chem. Engr., Cleveland, Ohio ???	B. '43
5.	PIERCE, HAROLD J., JR. - Power Engr.	B. '43
6.	HOORMAN, JAMES H. - Supvr., Chlorine Dept.	B. '51
7.	CHENEY, JOHN - Jr. Engr.	B. '52
8.	HOFF, JEAN - Wyandotte, Michigan	B. '42

MALLINCKRODT CHEMICAL WORKS

1.	MIDLAM, R. RICHARD - Process Engr., St. Louis, Mo.	B. '42
2.	SIMECEK, STEVE - Ch. E., Uranium Div., St. Louis, Mo.	B. '58
3.	SMITH, R. E. - Ch. E., Uranium Div., St. Louis, Mo.	B. '58
4.	ROSSER, JOHN P. - Chem. Engr., St. Louis, Mo.	B. '49

NORTON COMPANY

1.	MILLIGAN, LOWELL H. - Asst. Director of Research, Worcester, Mass.	M. '17 C. '40

MYERS, F. E., AND BROS. COMPANY

1.	CASCIANI, ROBERT W. - Asst. Plant Engr., Ashland, Ohio	B. '43

MERCK AND COMPANY

1.	BLAZEY, LELAND - Asst. Dir. of Engrg., Rahway, N. Jer.	M. '41
2.	LANGE, HENRY B. - Chem. Engr., Rahway, N. Jer.	B. '48

NEW YORK AND PENNSYLVANIA CO., INC.

1.	EDWARDS, C. H. - Supvr. Wastes Engr., Lock Haven, Penna.	B. '28

WYANDOTTE CHEMICAL (cont'd) Ken E. David, Wyandotte Mich (9) B '58

EASTMAN KODAK COMPA NY

1. MAYNE, DANIEL I., Director, Patent Dept. Rochester, New York B.'21
2. LOVELAND, ROGER P., Kodak Res. Labs, Rochester N.Y. M.(Chem) 21
3. TUCKER, WILLIAM M., Eastman Kodak 43 Kodak Park, Rochester 4, N.Y. B.'
4. FLETCHER, CHARLES, Division Supt. Tennessee Eastman, Kingsport, Tenn B.'30, P.39
5. CAMPBELL, W. LAWRENCE, Sr.Chem. Engr. Tennesse Eastman, KinsportTenn, M.'41
6. ETTER, DOYLE, Sr. Dev. Engr., Rochester, New York B.'42
7. LACY, KENNETH C., Engineer, Rochester New York B.'44
8. MICHENER, BEN, Asst. Engr. Supv., Rochester, New York B.'46
9. SECRIST, GEORGE R., Dev. Engr. B.'48, M'48
10. FRITSCHE, PAUL A., Photographic Engr., Rochester, New York B.'48, M'49
11. STELZER, H.L.JR., Engr., Rochester, New York B.'50, M'53
12. GRAVES, WILLIAM H., Rochester, New York B.'50, M'50
13. RICE, DONN PAUL, Engineer, Rochester New York B.'51
14. CARIS, PAUL, Ind. Engineer, Pal Alto, California, B. & M'51
15. MAHONEY, JOHN G., Ind. Engr., Rochester, New York b. & M.'53
16. SEATON, WILLIAM, Development Tennessee Eastman, Corp, Kingsport, Tenn M.55, P'58
17. COE, WILLIAM D., Chemical Engr, Mfg Exports Div. Rochester, N.Y. B & M.'56
18. FISHER, JOSEPH T., (U.S. Army) Dev. Engr., Rochester, New York B.'48M.'49
19. CARTER, ARTHUR L., Dev. Chem Engr, Rochester, New York B.'57
20. HARTLEY, BARRY, Engr., Rochester, New York B.'58

GENERAL ANILINE AND FILM CORPORATION (ANSCO), BINGHAMTON, N.Y.

1. AVERY, FRANCIS J. - B.'40
2. JENNINGS, ARTHUR F. - Genl. Supvr. B.'42
3. BOSTWICK, WALLACE L. - Chem. Engr. B.'44
4. SHIMROCK, THOMAS - Co. Emulsion Dept. B.'47

HAGAN CORP. - HALL LABORATORIES INCORPORATED

1. HALL, RALPH E.-(Retired) Director, Pittsburgh, Pa. M.'11 C.'39
2. CRANE, JOHN D. - Chief Engr., Micromet Div., Pittsburgh, Pa. B.'41
3. IVANCIC, JOSEPH A. - Cincinnati, Ohio B.'42
4. TARR, ROBERT N. - Chem. Engr., Salt Lake City, Utah B.'48

HARSHAW CHEMICAL COMPANY

1. HINES, PAUL R. - (Deceased) El Segundo, Calif. B.'22
2. MALIK, FRANCIS J. - Lakewood, Ohio B.'40
3. VOELKERDING, HENRY A. - Eng. Dept. 109094 Mt. Overlook Rd., Cleveland, O. B.'51

W. R. GRACE AND CO., DAVISON CHEMICAL DIVISION

1. BRANT, LEO HENRY - Mgr., Market Research B.'29
2. HELM, CHARLES D. - Mgr., New Products Preparation B.'41
3. HURLEY, FORREST R. - Baltimore, Md. B.'42 P.'54
4. TALISA, LUIS E. - (Resigned) Now owns own company B.'47

HERCULES POWDER COMPANY

1. VOLK, FRANK W. - Mgr. Production, Naval Stores, Wilmington, Del. B.'23
2. WAXBOM, ERNEST M. - Tech. Asst. to Dir. of Oprns., P.M.C. Div. B.'26 M.'28
3. STAUFFER, DONALD F. - Tech. Rep. B.'47
4. HAWK, ELLIS L. - Wilmington Del. B&M.'50
5. LANE, FRED K. - Engr., Wilmington, Del. B.'55

HOOKER ELECTROCHEMICAL COMPANY

1. ANDERSON, S. I. - (Retired) Asst. Div. Mgr., New York, N.Y. B.'17
2. WELLS, LAWRENCE - Control Lab, Niagara Falls, N.Y. B.'32
3. DUCKWALL, GEORGE E. - Plant Engr., Niagara Falls, N.Y. B.'40
4. BISHOP, CARL H. - Chem. Engr., Niagara Falls, N.Y. B.'37
5. LITTLER, JOSEPH B. - Maintenance Engr., North Tonawanda, N.Y. M.'44
6. GEORGE, WALTER T. - Prod. Coordinator, Niagara Falls, N.Y. B.'50
7. KREINER, WILLIAM E. - Niagara Falls, N.Y.
8. BHATT, MAHENDRRA NARHARI - Niagara Falls, N. Y. B.'55

B=Bachelor; M=Master; P=Ph.D.; C=Professional

AMERICAN CAN COMPANY

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	KINCAID, CHARLES M. - Tech. Svc.	B.'47, M.'48
2.	McLAIN, CLEMENT J. - Can-making Technologist, Maywood, Ill.	B.'48
3.	GUY, ALLEN C. JR. - Asst. Supvr., Safety & Ind. Hygiene, Newark, N. Jer.	B.'48

ATLANTIC REFINING COMPANY

1.	HUR, J. JAMES - Supvr. Engr., Res.&Dev., Philadelphia, Pa.	B.'42, M.'47
2.	JONES, ROBERT - Supvr., S.W. Personnel Div.	B.'49
3.	WILSON, ROBERT - Asso. Reservoir Engr. Research Development Dallas, Texas	M.'51
4.	COLMERY, MERRILL D. - Mech. Trng. Program, Philadelphia, Pa.	B.'51
5.	RAMSTHALER, JACK H. - Engineer, Philadelphia, Pa.	B.&M.'52

PETROLITE CORPORATION

1.	DEGROOTE, MELVIN - Vice-Pesident,Tretolite Div.,Webster Grove,Mo.	B.'15, C'42
2.	MEYERS, G. L. - Chief Engr., Bareco Oil Co., Div. of Petrolite Corp., Barnsdall, Oklahoma	B.'39, M.'41

IRONSIDES COMPANY

1.	JACOBS, KEITH S. - Chem. Engr., Columbus 16, Ohio	B.'47

NATIONAL LEAD COMPANY

1.	BAKER, RALPH D. - Sales Engr., New York, New York	B.'20
2.	WEILER, JOHN E. - Process Engr., Titanium Div., Niagara Falls,N.Y.	B.'33,M.'35
3.	ARNOLD, DONALD S. - Atomic Div., Cincinnati, Ohio	B.'42,M.'47,P.'49
4.	McMULLEN, BRYCE H. - Chem. Engr., Dev. and Engr.Dept.,South Amboy,N.J. -	M'47,P.'49
5.	OSTENDORF, WESLEY C. - Atomic Div., Cincinnati, Ohio	B.'48
6.	IZANT, PAUL W. - Proj. Engr., Titanium Div., S. Amboy,N.J.	B.'51

NATIONAL CASH REGISTER COMPANY

1.	NELSON, BYRON W. - Hd., Plastics Dev.Lab., Dayton,Ohio	B.'36
2.	THACKER, NED A. - Chem. Engr., Dayton, Ohio	B.'37
3.	ANESHANSLEY, CLAY H. - Dept. Head, Mfg. Lab., Dayton,Ohio	B.'40
4.	AUSTEN, HERMAN E. - Chem. Engr., Dayton, Ohio	B.'40
5.	McKIBBEN, ROBERT F. - Materials Lab., Dayton, Ohio	B.'40
6.	MONTCELLO, RALPH V. - Head, Materials Dept., Dayton,Ohio	B.'48
7.	HABER, ROBERT D. - Chem. Engr., Dayton, Ohio	B.'50
8.	WILLIAMS, HARRY - (DECEASED) - Vice-President	B.'08, C'41

NEW JERSEY ZINC

1.	ANDREWS, FRED T. - Chem. Engr., Palmerton, Pennsylvania	B.'18

B=Bachelor; M=Master; P=Ph.D.; C=Professional

BRUNSWICK PULP AND PAPER COMPANY

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	HOMANS, ROY - Dev. Engr., Brunswick, Ga.	M.'41
HANKINS CONTAINER COMPANY		
1.	MIESSLER, PAUL W., JR. - Cleveland, Ohio	B.'50
INTERNATIONAL PAPER COMPANY		
1.	EAST, I. Y. - Coordinator Pulp and Paper Research, N.Y.C., N.Y.	M.'26
KIMBERLE-CLARK		
1.	CRONENBERGER, HAROLD - Planning Engr., Niagara Falls, N.Y.	B.29 M.'30
WRENN PAPER COMPANY		
1.	ROESS, CARL D. - Tech. Dir., 806 First Ave., Middletown, Ohio	B.'28 M.'29
DEERFIELD GLASSIVE COMPANY		
1.	HILL, CHARLES E. JR. - Asst. to Pres.	B.'48

CERAMIC, LIME AND RELATED COMPANIES

NATIONAL LIME AND STONE COMPANY		
1.	VOGEL, RALPH - Chief Chem. Engr.	B.'26 M.'32 P.'38
OHIO HYDRATE AND SUPPLY COMPANY		
1.	NIEMAN, ARNOLD H. - Chemist, Woodville, Ohio	M.'28
KELLEY ISLAND LIME AND TRANSPORT COMPANY		
1.	MASON, GILBERT E. - Columbus, Ohio	B.'31
MARBLEHEAD LIME COMPANY		
1.	WING, WALLACE E. - President	B.'22
U. S. GYPSUM COMPANY		
1.	WISS, JOHN - Consultant, Columbus, Ohio	B.'21
2.	BLANCHARD, C. R. - Shaft Kiln Supt., Genoa, Ohio	B.'25
3.	SCHNEIDER, ROY E. - Div. Sales Mgr., Chicago, Ill.	B.'43 M.'47
4.	LOUIS, WILLIAM C., JR. - Sales, Atlanta, Ga.	B.'43
5.	ATWOOD, THOMAS R. - Engr., Gypsum, Ohio	B.'47 M.'51
BASIC REFRACTORIES, INC., FOSTORIA, OHIO		
1.	BRANT, A. M. - Sr. Chem. Engr., Fostoria, Ohio	B.'17 M.'22 P.'28
2.	LEPLEY, RICHARD H. - Assoc. Chem. Engr., Bettsville, Ohio	B.'49
KNIGHT, MAURICE A., COMPANY		
1.	STRIGLE, RALPH F., JR. - Research Dir.	B.'49 C.'58
BRUSH POTTERY COMPANY		
1.	BARNETT, W. CLARE - President	B.'28
GENERAL REFRACTORIES COMPANY		
1.	TROSTEL, LOUIS J. - Mgr., Research Labs, Box 1673, Baltimore, Md.	B.'18 C.'36
U. S. STONEWARE COMPANY		
1.	ECKERT, JOHN S. - Mgr., Prod. Engr., Cuyahoga Falls, Ohio	B.'33
2.	HUNTINGTON, RICHARD - Chem. Engr., Tallmadge, Ohio	B.'53

FERRO CORPORATION		
1.	ROBSON, JAMES T. - Mgr. and Vice Pres., Allied Engr. Div.	B.'19 P.'23
2.	CONNARE, HAROLD - Dir. of Personnel, Cleveland, Ohio	B.'39
DURIRON COMPANY		
1.	LUCE, WALTER - Tech. Sales, Dayton, Ohio	B.'43
2.	SUMNER, EARL - Research Engr.	B.'50
FERROTHERM COMPANY		
1.	LONG, ROGER A. - Mgr., Chief Engr., Cleveland 3, Ohio	B.'43

B=Bachelor; M=Master; P=Ph.D.; C=Professional

MONSANTO CHEMICAL CORPORATION

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	SHATTUCK, HAROLD F. - St. Louis, Missouri		M. (Chem) '19
2.	HARMAN, M. W. - Group Leader, Nitro, West Virginia		B. '20
3.	HALE, DAVID C. - Engr. Supv., Trenton, Michigan		B. '38
4.	CUNNINGHAM, PAUL F. - Power Supt., Texas City, Texas		B. '38
5.	BUEKER, RICHARD W. - Oper. Supt., Springfield, Mass.		B. '40
6.	GILMORE, DAVID S. - Sr. Process Engr., St. Louis, Missouri		B. '40
7.	STUBER, PAUL J. - Project Engr., Eng. Sales Dept., St. Louis, Mo.		B. '42, M. '48
8.	HARSHMAN, JOHN B. - Chem. Engr., Mound Lab., Miamisburg, Ohio		B. '46, M. '48
9.	HILL, ROBERT H. - Chem. Engr., Nitro, West Virginia		M. '47, P. '52
10.	KNAPP, WILLIAM G. - Res. Chem. Engr., St.Louis, Missouri		M. '47, P. '49
11.	WIEDERHOLD, EDWARD W. - Monsanto-Dayton		B. '49
12.	WITHROW, ALFRED E. - Process Engr., Texas City, Texas		B. and M. '50
13.	BOCH, THOMAS R. - Ass't. Area Supt., Nitro, West Virginia		B. '51
14.	KOEGLE, JOHN S. - Res. Chem. Engr., St. Louis, Missouri		P. '51
15.	WEIR, DOUGLAS - Somerville Road, W. Footscray, Victoria, Aust.		M. '54
16.	WEISZ, JOHN - Plastics Prod., Springfield, Mass.		B. '54, M. '56
17.	WINKLE, THOMAS R. - Chem. Engr., Texas City, Texas		B. '57
18.	HAERING, ED - Chem. Engr., St. Louis (Now in U.S. Navy)		B. and M'56
19.	GALLOWAY, HOWARD - Chem. Engr., Nitro, West Virginia		B. '47

CHEMSTRAND CORPORATION

1.	HUGHEY, GEORGE B. - Intermediate Tech. Supt., Pensacola, Florida		M. '38, P. '41
2.	WARNER, ROGER M. - Production Supervisor, Pensacola, Florida		B. '40
3.	BLACKWOOD, CHARLES W. - Supervisor, Tech. Dept., Pensacola, Fla.		B. '48
4.	SETZER, CARL J. - Chem. Engr., Decatur, Alabama		B. '48, M. '48, P. '52
5.	HARRINGTON, R. E. - Pensacola, Florida (?)		

AMERICAN VISCOSE CORPORATION

1.	PORTZ, Woodrow W. - Patent Attorney, Louisville, Kentucky		B. '38

FOOD MACHINERY AND CHEMICAL CORPORATION

1.	DAVIS, DANA DEAN - Proj. Engr., Fine Chem. Dept. U.S. Ind. Chem. Div.		B. '38
2.	IWATA, HARRY M. - Insecticide Supt., U.S. Ind. Chem. Div.; Fairfield Chem. Div., Baltimore 3, Md.		B. '42M. '47
3.	MC DOUGAL, NORRIS E. - Genl. Supt., Intermountain Chemical Co. Div., Green River, Wyo.		B. '35
4.	JENNEY, T. M. - Becco Chem. Div., Buffalo 7, N.Y.		B. '49
5.	LUTZ, LELAND J. - Supvr., New York, N. Y.		M. '47 P. '51
6.	WINCE, KENNETH F. - Power Plant Supv., Westvaco Chem. Div., South Charleston, West Virginia		W. '36

B=Bachelor; M=Master; P=Ph.D.; C=Professional

TEXAS CO.

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR

1. RUIDISCH, LOUIS E. - Chem. Engr., Beacon, N.Y. B.'37 M.'38 P.'40
2. SCHNEIDER, NORBERT - Chem. Engr., Beacon, N.Y. B.'49
3. POLLOCK, MORTON - Chem. Engr., Refining Engr. Div., N.Y.C., N.Y. B&M.'49

PROCESSORS, INCORPORATED

1. TRUESDELL, DAN A. - Mgr., Operations and Development B.'36

FOOD AND RELATED COMPANIES

ARMOUR AND COMPANY

1. MOORE, HARRY C. - (RETIRED) Vice-President, Armour Fertilizer Works, Atlanta, Ga. B.'07
2. BENTON, FRANCIS LEE - Research Labs., Chicago, Ill. B.'35 M.'36 P.40

CAPITAL CITY PRODUCTS

1. LAMERS, GERHARD F. - Columbus, Ohio B.'31 M.'39

DIAMOND CRYSTAL-COLONIAL SALT COMPANY

1. GILKEY, W. K. - Plant Supt., Kenmore, Ohio B.'21
2. QUINN, ROY F. - Qual. Cont. Engr., St. Clair, Michigan B.'47

GENERAL FOODS CORPORATION

1. GRICE, HARVEY R. (Recently Appointed Pres.-Graceland College) Mgr., Mfgr. and Engr., Kankakee Operations B.'37 M.'38 P.'41
2. JAMES, DAVID E. - Section Hd., Engr. Res. Center, Tarrytown, N.Y. B.'42 M.'48

KEEVER STARCH CO.

1. SALTER, JOHN W. - Chief Engr., Columbus, Ohio B.'41

THOMAS J. LIPTON CO.

1. KENNEDY, J. W. - Vice Pres., Tarrytown, N.Y. B.'16

NATIONAL STARCH PRODUCTS INC.

1. GEORGE, JOHN D. - Asst. Dir. of Mfg. B.'39
2. EASTMAN, FREDERICK - Proc. Engr., Dunellen, N. Jer. B.'38 M.'39
3. ROHRER, HOWARD G. - Prod. Mgr., Indianapolis, Ind. B.'39
4. MILLER, JOHN H. - Chem. Engr., New York, 16, N. Y. B.'40
5. PIWOWAR, DANIEL T. - Maintenance Engr., Plainfield, N. Jer. B.'40
6. UNKEL, HARRY RICHARD - 1700 West First, Plainfield, N. Jer. B.'41

NESTLES INC.

1. ANDREWS, WILLARD F. - Mgr. Res. and Dev. Chocolate Products, Fulton, N.Y. B.'47
2. SERFASS, ROBERT W. - Chem. Engr. Proc. Develop., Marysville, Ohio B.'50 M.'55
3. HILL, JACOB C. III - Chem. Engr., Marysville, Ohio M.'56
4. VAN SISE, JOHN - Chem. Engr., Marysville, Ohio B.'53

STANDARD BRANDS INC.

1. LAUBE, ARTHUR H. - Staff Engr., Central Engr. Div. B.'41
2. LUCAS, MICHAEL J. - Asst. to Plant Engr., Fleishmann Mfg. Div., Pekin, Ill. B.'50
3. WEBER, SPENCER G. - (RETIRED) Mgr., Washington, D. C. M.'18
   Residence: 1504 Oak Knoll Drive, Cincinnati, Ohio

B=Bachelor; M=Master; P=Ph.D.; C-Professional

DIAMOND ALKALI

NO.	NAME AND POSITION IF KNOWN - DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	OLSON, HARRY S. - Tech. Service Division, Painesville, Ohio	B.'30,M.'31
2.	KUNTZ, T. F. - Chem. Engr., Painesville, Ohio	B.'33
3.	SHAFFER, JOHN H. - Area Supt., Painesville, Ohio	B.'41
4.	COLE, JEFF - Staff Engr., Cleveland, Ohio	B.'38
5.	FERRON, WILLIAM O. - Res. and Dev. Lab., Painesville, Ohio	B.'42
6.	LOFTFIELD, RICHARD - Chem. Engr., Painesville, Ohio	B.'43
7.	SEBIAN, ALLOYSIUS M. - Plant Supt., Kearny, New Jersey	B.'47
8.	COCHERELL, ARTHUR L. - Dev. Engr., Tech. Center, Painesville, Ohio	B.'48
9.	CLARK, JAMES H. - Tech. Service, Painesville, Ohio	B.'51
10.	CAMMARN, JOHN W. - Chem. Engr., Painesville, Ohio	B.and M.'56
11.	BAK, EUGENE - Chem. Engr., Painesville, Ohio	B.'57
12.	HEDGE, THOMAS - Chem. Engr., Painesville, Ohio	M.'58

GLASS COMPANIES

CORNING GLASS WORKS

1. TOMB, WILLIAM H., JR. - Sales Mgr., Specialty Products B.'35

DUPLATE CORPORATION

1. HAUX, ELMER - Res. Engr., Tarenton, Pa. P.'33

LAMB GLASS COMPANY

1. WARD, WILLIAM P. - Asst. Factory Mgr., Cols. Rod., Mt. Vernon, Ohio B.'36

PITTSBURGH PLATE GLASS

1. MORRIS, PAUL R., Res. Chemist, Creighton, Pennsylvania B.'14

MAYWOOD GLASS COMPANY

1. CALLINAN, J. GAVIN - Plant Mgr., Los Angeles, Calif. B.'26

LIBBEY-OWENS-FORD GLASS COMPANY

1. GRAETZ, R. S. - Charleston, W. Va. B.'26
2. JAROSI, JOHN J. - Toledo, Ohio B.'36
3. BROWN, CHESTER J. JR. - Res. Engr., Res. Div., Toledo, Ohio B.'43
4. BOYD, CHARLES E. - Proj. Engr., Toledo, Ohio (Former Employee) B.'43
5. GROVE, DAVID R. - Tech. Svc. Engr., Toledo, Ohio B.'48

OWENS-ILLINOIS GLASS COMPANY

1. BISHOP, DANA L. - w.'28
2. LOUDEN, MALCOLM H. - Plant Engr. B.'33
3. BROOKOVER, GEORGE B. - Asst. Chief Physicist, Kimble Glass, Toledo,O. B.'39
4. HACKENBERG, HAROLD F. - Food Technologist, Toledo, Ohio B&M.'39
5. WITTMER, HOWARD G. - Technologist, Glassboro, N. Jer. B.'49
6. KALMBACH, WILLIAM J. - Technologist, Toledo, Ohio, Kimble Glass B.'47

OWENS-CORNING FIBERGLASS CORPORATION

1. PRIOR, F. E. - Analyst, Newark, Ohio B.'25
2. MORRISON, A. RUSSEL - Mgr., Res. and Dev. Div. B.'35 M.'36
3. ATKINSON, ROBERT S. - Admin. and Planning Engr., N.Y.C., N.Y. B.'45
4. HULLINGER, LEWIS C. - Proc. Dev. Engr., Newark, Ohio B.'47
5. KOVREG, LOUIS A. - Textile Sales Mgr., Dallas, Texas B.'47
6. EVANS, ROBERT E. - Proj. Engr., Newark, Ohio B.'48
7. TOMLINSON, WILLIAM H. - Kansas City, Kansas B.'48

B = Bachelor; M = Master; P = Ph.D.; C= Professional
W=Withdrew

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
	PHARMACEUTICALS AND RELATED INDUSTRIES		
	ABBOTT LABORATORIES		
1.	SIMON, DANIEL - Chem. Engr., N. Chicago, Illinois		M.'47
2.	LING, WILFORD C. - Proc Dev. Dept., N. Chicago, Illinois		B.'50,M.'53
	AMERICAN PHARMACEUTICAL COMPANY		
1.	ORT, JOHN M. - (DECEASED Aug. 1951)		B.'18,M.'19,P.'24
	BRISTOL LAB., INC.		
1.	KOLBAS, JOHN M. - Night Supt., Syracuse, New York		B.'47
	LAKE ERIE PHARMACAL INC.		
1.	SZENDERY, LOUIS E. - President and Owner, Sandusky, Ohio		B.A.(Chem)'16 ?
	ELI LILLY AND COMPANY		
1.	ERNSBERGER, RALPH - Head, Pharm., Indianapolis, Indiana		B.'40,M.'41
	PFIZER AND COMPANY, CHAS.		
1.	IRWIN, JAMES F. - Tech. Sales Rep., Bellaire, Ohio		B.'49
	PITMAN-MOORE COMPANY - ALLIED LABORATORIES		
1.	HARMAN, CHARLES T. - V.P. Pharmaceutical Director, Indianapolis 6,IND.		B.'24
	SQUIBB CO., E.R.		
1.	JONES, WILLIAM S. - Tech. Asst., New Brunswick, New Jersey		M'20,P'24
2.	COVERT, ARTHUR S. - Chem. Engr., Flushing, New York		B.'38,M.'47
	STERLING DRUG, INC.		
1.	OSBORNE, EARL H. - National Brands Div., Trenton, N.J.		B.'57
	UPJOHN COMPANY		
1.	INNIS, ROBERT C. - Dept.Head, Kalamazoo, Michigan		B.Phar.'30 M.'32

	DOEHLER JARVIS CORPORATION		
1.	GORMAN, JOSEPH - Plant Metallurgist, Toledo, Ohio		B.'23
2.	FOWLER, WILLIAM - Plant Metallurgist, Toledo, Ohio		B.'46
	FASSON, INC.		
1.	SCHARENBERG, ROBERT I. - Mfg. Engr., Painesville, Ohio		B'48,M'49
	INDUSTRIAL RAYON CORPORATION		
1.	McLELLAN, KENNETH M. - Asst. Res. Mgr., Cleveland, Ohio		B.'33
2.	McFARREN, GERALD - Research, Cleveland, Ohio		M.'37
3.	MASSIE, JAMES E. - Supervisor, Cleveland 21, Ohio		B.'40
4.	ZEBEHAZY, FRANK - Chemist, Painesville, Ohio		B.'40
5.	CARDINA, JAMES A. - Research Chem. Engr., Cleveland, Ohio		B.'42
6.	SKOLNIK, LEONARD - Research, Cleveland, Ohio		B.'43
7.	CHUTE, ROBERT - Research, Cleveland, Ohio		W.'57

MISCELLANEOUS COMPANIES (CONT'D.)

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
ATOMICS INTERNATIONAL - NAA, INC.			
1.	NATHAN, MILTON E. - Chem. Engr., Canoga Park, California		B.'48
BAKER, J. T. and COMPANY			
1.	SHOEMAKER, C. E. - Res. and Div. Chemist, Phillipsburg, N. J.		B'43, M'46,P.'49
BELDING CORTICELLI			
1.	CRAW, WALTER E. - Threads Mfg. Div., Putnam, Connecticut		B.'43
CABOT CARBON CO.			
1.	FRIAUT, GEORGE F. - Engr., Box 1101, Pampa, Texas		B.'24
CARBORUNDUM COMPANY			
1.	BUIKE, MELVIN - Dev. Engr., Niagara Falls, New York		B.'44
CLOROX CHEMICAL COMPANY			
1.	FORTUNE, LEONARD F. - Plant Mgr., Chelsea, Michigan		B.'34
COLUMBUS COATED FABRICS CORPORATION			
1.	MILLISOR, H. - Chem. Engr., Columbus, Ohio		B.'34
2.	OGAN, LEONARD H. - Foreman, Columbus, Ohio		B.'48
COWLES CHEMICAL COMPANY			
1.	SCHEIDT, ALFRED W. - Chem. Engr., Seukren, New Jersey		B.'13
DOVER CHEMICAL CORPORATION			
1.	THRUSH, SAMUEL R. - Plant Mgr., Dover, Ohio		B.'47
DRACKETT MANUFACTURING COMPANY			
1.	DRACKETT, HARRY R. (DECEASED) President, Cincinnati,Ohio		B.'07
DIAMOND MATCH COMPANY			
1.	AUGUSTINE, WALTER O. - Vice-President, New York, New York		B.'12
EMERY INDUSTRIES			
1.	BARRETT, FRED O. - Sr. Res. Chemist, Cincinnati 2, Ohio		B.'37,M.'40,P.'42
2.	REINERT, NORBERT F. - Sales Engr., Carew Tower Bldg.,Cincinnati,O.		B.'51
FOOTE MINERAL COMPANY			
1.	REMESCH, ERNEST A. - Supt., Sunbright Plant, Sunbright, Va.		B.'28,M.'33
GENERAL MILLS			
1.	HAVERFIELD, THOMAS A. - Chem. Engr., O-Cel-O, Tonawanda,N.Y.		B.'49
GIBSON HOMANS COMPANY			
1.	FISHER, ELMER J. - Dir. of Research, Cleveland 6, Ohio		B.'23
GLYCO CHEMICAL COMPANY			
1.	FLOOD, BERNARD F., JR. - Chem. Engr., New Martinsville, W. Va.		B.'48
THE GRISCOM-RUSSELL COMPANY			
1.	ORFANEDES, STEVEN R. - Proposition Engr., Massillon, Ohio		B.'52
HARWICH STANDARD CHEMICAL COMPANY			
1.	GREER, HARVEY G. - Tech. Director, Akron 5, Ohio		B.'29
HAWAIIAN PINEAPPLE COMPANY, LTD.			
1.	GOUGH, JAMES - Chem. Engr., Honolulu, Hawaii		B.'52
HEATING ENGINEER			
1.	SCHAAD, FRED N. - 3252 Roanoke Road, Kansas City 8, Mo.		B.'17

B=Bachelor; M=Master; P-Ph.D.; C=Professional

MISCELLANEOUS COMPANIES

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
ERIE RESISTOR CORPORATION			
1.	TOPPARI, JOHN E. - Chief Chem. Engr., Erie, Pennsylvania		B.'31
HOBART BROTHERS COMPANY			
1.	REINMULLER, ERNEST - Chem. Engr., Troy, Ohio		B.'53
2.	FERRIS, TOM - Chem. Engr., Troy, Ohio		B.'58
HO-PAR INC.			
1.	DARBY, HAYES T. - Chemist, State College, Pennsylvania		B.'12
INTERNATIONAL MINERALS AND CHEM. CORP.			
1.	SHAFER, RALPH W. - Manager, San Jose, California		B.'14
INTERNATIONAL NICKEL COMPANY, INC.			
1.	ROBERTS, JOHN L. - Chief Mech. Engr., Huntington, W. Va.		B.'23
IOWA METHODIST HOSPITAL			
1.	DUBOWSKI, KURT M. - Biochemist and Asst. Dir.Labs., Des Moines,Iowa		M.'47,P'48
JOANNA WESTERN MILLS			
1.	HAUGHTON, JOHN POOL - Sales Manager, Plastic Fabrics Div.,Chicago,Ill.		B.'37
2.	MILLER, CHARLES W. - Chem. Engr., Brookfield, Illinois		B.'43
JOHNS-MANVILLE INTERNATIONAL CORP.			
1.	JANOUSEE, JOHN F. - Staff Engr., New York, New York		B.'42
LINDBERG ENGINEERING COMPANY			
1.	KOEBEL, NORBERT K. = Director Research, Chicago, Ill.		B.'35
MANGILL CHEMICAL COMPANY			
1.	CUSICK, WILLIAM - Chem. Engr., Cleveland, Ohio		B.'35
MASONITE CORPORATION			
1.	MONTGOMERY, GEORGE H. - Asst. Mgr., Dayton, Ohio		B.'44
McKay COMPANY			
1.	REID, HARRY F. - Manager, York, Pennsylvania		M.'48
MINNESOTA MINING AND MFG. COMPANY			
1.	KLINK, WILLIAM A., JR. - Sr. Chem. Engr., St. Paul, Minnesota		B.'48
2.	RAMBOSEC, GEORGE - Sr. Chem. Engr., St. Paul, Minnesota		M'49,P.'50
MEADOWBROOK CORPORATION			
1.	ROUTA, ALBERT - Chief Chemist, Spelter, W. Va.		B.'23
NARMCO RESINS AND COATINGS COMPANY			
1.	BREIDENBACH, LLOYD J. - Asst. Gen. Mgr., Costa Mesa, California		B.'43
NATIONAL DISTILLERS CHEMICAL CORP.			
1.	SEFERIAN, JOHN R. - (DECEASED 1953) - Ashtabula, Ohio		B.'51
NORTH AMERICAN COAL CORPORATION			
1.	SAVAGE, ROBERT L. - Vice President, Research, Cleveland 20, Ohio		B'38,M'42,P'47
OHIO MATCH COMPANY			
1.	SINKS, FRANK L. - Chief Chemist, Wadsworth, Ohio		B.'17

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MISCELLANEOUS COMPANIES

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
PERFECT CIRCLE COMPANY, HAGERTOWN, IND.			
1.	BANCROFT, R. H. - Manager, Hagertown, Indiana		B.'25
U.S. PHOSPHORIC PRODUCTS DIVISION			
1.	BEER, THOMAS - Sp'l.Asst.to Chem.Director-Research, Tampa,Florida		B.'06
PLUMER LEATHER COMPANY			
1.	PLUMER, JOHN E. - Vice-President, Cleveland, Ohio		B.'36
REILLY TAR AND CHEMICAL CORPORATION			
1.	SCHULTE, HENRY J. - Cleveland Mgr., Cleveland, Ohio		B.'21
2.	GRAFF, OLIN - Res.and Dev.Engr., Indianapolis, Indiana		B.'34
REMMINGTON ARMS COMPANY			
1.	STAUFFER, WILLIAM O. - Mgr., Res. Div., Bridgeport, Connecticut		M.'25
RESI CHEMICAL CORPORATION			
1.	ROMAY, EDWARD J. - Vice-President, Swanton, Ohio		B.'47
ROCKY MOUNTAIN ARSENAL			
1.	SIMERAL, N. B. - Chem. Engr., Denver 2, Colorado		B.'37
ROYAL TYPEWRITER COMPANY			
1.	GORMAN, E. W. - Mgr., Erie, Pennsylvania		B.'10
SEARLE, G. D. and Co.			
1.	PURINTON, JOHN A.,JR. - Dir. of Production, Chicago, Illinois		B'30,M'31,P'33
SECRODS COMPANY			
1.	SITTLER, HOWARD L. - Metallurgist, Baltimore, Maryland		B'32,M'33
SHELLMAR PROD. COMPANY			
1.	COOPER, ALVIN G. - Chem. Engr., So.Gate, California		B.'47
STALEY, A. E. MANUFACTURING COMPANY			
1.	ODY, RICHARD E. - Chem. Engr., Decatur, Illinois		B.'51,M.'57
STAUFFER CHEMICAL COMPANY			
1.	MILLER, HARRY J. - Asst.Prod. Coordinator, New York 17, New York		B.'27
STROMBERG-CARLSON COMPANY			
1.	GREEN, HARRY J., JR. - Sr.Prof. Engr., Rochester 3, New York		B.'32,M.'38, P.'43
SUNNEN PRODUCTS			
1.	LANDIN, CLIFFORD F. - Sales and Serv. Engr., St. Louis, Mo.		B.'24
SURBURBAN COMPANY			
1.	SLUIZER, ALLAN L. - Chem. Engr., Morton Grove, Ill.		B'47,M'48
TAYLER CORPORATION			
1.	LINZELL, H. K. - Vice-President, New York, New York		B.'21
TIMKIN ROLLER BEARING COMPANY			
1.	RODERICK, TOM G. - Chief Ind. Engr., Canton, Ohio		B.'12
2.	ELSAESSER, R. R. - Supt., Tube Mills, Canton, Ohio		B.and M.'35
3.	MRAVEC, JOSEPH G. - Metallurgist, Canton, Ohio		B.'36

B=Bachelor; M=Masters; P=Ph.D.; C=Professional

MISCELLANEOUS COMPANIES

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
ALUMINUM COMPANY OF AMERICA			
1.	MARCH, JOHN C. - Chem. Res. Lab., Marysville, Tennessee		B.'32
2.	VANDER WERF, FRANCIS J. - P. O. Box 459, Chillicothe, Ohio		B.'40
ALCO PRODUCTS INC.			
1.	MEDIN, AARON, L. - Hd. Chem. Process Engr., Atomic Energy Dept., Schenectedy, N.Y.		M.'49 P.'51
AMERICAN STANDARD			
1.	BRADFUTE, JOHN O. - Atomic Energy Division, Redwood City, Calif.		B.andM.'50
ARCHER-DANIELS-Midland Co.			
1.	KEINHOLZ, PAUL J. - Chem. Engr., Minneapolis, Minn.		B.'57
BABCOCK WILCOX			
1.	ESTEP, LAWRENCE H. - Asst. Mgr., Cleveland Eng. Sec., Cleveland, Ohio		B.'43
2.	KNAPP, WILBUR D. - Chem. Engr., Alliance, Ohio		B.'52
3.	PIOTTER, ELMER C. (DECEASED) Alliance, Ohio		B.'32
BETZ LABORATORIES INC.			
1.	METCALF, JACK - District Engr., Philadelphia, Pennsylvania		B.'49
CARY CHEMICAL COMPANY			
1.	HAHN, JAMES C. - Plant Mg'r. - Flemington, New Jersey		B.'50
CLEVELAND GRAPHITE BRONZE			
1.	KEKICH, JOHN - Chem. Engr., Cleveland, Ohio		B.'43
COLLIERVILLE DAIRY PRODUCTS COMPANY			
1.	ANNIS, B. B. - President, Collierville, Tennessee		B.'25
COLUMBIAN CARBON			
1.	TRELEAVEN, LLOYD D. - Technical Representative, N.Y.17, N.Y.		B.'46
COLUMBUS PIPE and EQUIPMENT COMPANY			
1.	FULTZ, ALBERT S. - Salesman, Columbus, Ohio		B.'20
DuBOIS COMPANY, INC.			
1.	FARISON, ROBERT E. - Res. Engr., Cincinnati, Ohio		B.'43
EAGLE PICHER LEAD COMPANY			
1.	Taylor, HAROLD B. - Sales Engr., Chicago, Illinois		B.'15
FIBERBOARD PAPER PRODUCTS INC. (PABCO)			
1.	MILLER, ARTHUR R. JR. - Mgr., Linoleum Dept., Metucken, New Jersey		B.'31
FRONTIER CHEMICAL COMPANY			
1.	KOLINS, W. H. - Vice-President, Wichita, Kansas		B.'42
2.	KOLINS, J. T. - Plant Mgr., Denver City, Texas		B.'48
GIBSON HOMANS COMPANY			
1.	FISHER, ELMER J. - Director of Research, Rocky River 16, Ohio		B.'23
GIRDLER CORPORATION			
1.	McCONNELL, WILLIAM C. - Operating Engr., Louisville, Kentucky		B.'43
2.	WOOD, W. H. - 224 E. Broadway, Louisville, Kentucky		B.'41

MISCELLANEOUS COMPANIES (Cont'd.)

NO. NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
HOME PRODUCTS INTERNATIONAL LTD.		
1. MEAD, WILLIAM J. - Asst. Tech. Director, New York, New York		B.'48
HOTPOINT INC.		
1. SUTTON, R. J. - Res. Engr., Chicago, Illinois		B.'25
HOUDRY PROCESS CO.		
1. NEWMAN, JOHN - Chem. Engr., Philadelphia, Pennsylvania		M.'49
JOHNS - MANVILLE CORPORATION		
1. HANSON, FREDERICK H. - Product Dev. Engr., Research Center, Manville, N.J.		B.'42
JEFFERSON CHEMICAL COMPANY		
1. AGAPETUS, NAPOLEON A. - Chief Process Engr., Houston 1, Texas		B.'35, M.'36, P.'40
JEFFERY MANUFACTURING COMPANY		
1. HARBESON, WILLIS - Designer, Columbus, Ohio		B.'43, M'47
HERRICK L. JOHNSON INC.		
1. NEWTON, CHARLES L. - Sr. Operator, Columbus, Ohio		B.'51
KING POWDER COMPANY		
1. LINDSLEY, M. F. - Asst. to President, Cincinnati, Ohio		B.'27, P.'39
MARGAR COMPANY		
1. GARRETT, RICHARD M. - Owner, El Segundo, California		B.'43
PERMAFLEX MOLD COMPANY		
1. WISS, JOHN E. - Tech. Director, Columbus, Ohio		B.'21
SUNBEAM CORPORATION		
1. GARDNER, DONALD H. - Tech. Service and Sales, Furnace Div., Detroit, Michigan		B.'33
GEORGE L. WILLIAMS COMPANY		
1. SWINK, WILLIAM F. - Chem. Engr., Cleveland, Ohio (?)		B.'34
BARNEBEY-CHENEY COMPANY		
1. BARNEBEY, HERBERT L. - Vice President, Columbus 19, Ohio		B.'33
BRULIN AND CO., INC.		
1. GREEN, HERBERT L. - Chief Chemist, Indianapolis, 7, Indiana		M.'48
BRUSH BERYLLIUM COMPANY		
1. BEAVER, WALLACE, W. - Chem. Engr., Cleveland, Ohio		M.'47
2. VINCI, FRANK ALBERTO - Chief Chemist, 4301 Perkins Ave., Cleveland, O.		M.'37
A. B. DICK CO.		
1. HOOVER, KEITH S. - Manager, Chemical Res. and Eng., Chicago, Ill.		M.'39
E. F. DREW AND CO., INC.		
1. ZINZALIAN, GEORGE - Vice President, New York 10, New York		B.'25, M.'29, D.'31

B=Bachelor; M= Masters; P=Ph.D.; C=Professional

MISCELLANEOUS COMPANIES (CONT'D.)

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
FRANKLIN GLUE COMPANY (Columbus, Ohio)			
1.	SNIDER, ROBERT F. - Special Chemicals Technical Repre., Columbus, O.		B.'36; M.'38, P.'45
2.	BECKEL, FRANCIS DELMAR - Plant Supt., Columbus, Ohio		B.'39
FOSTER GRANT COMPANY, INC.			
1.	BERGER, JACK - Injection Molding Supervisor, Leominister, Mass.		B.'48
KAISER ALUMINUM COMPANY			
1.	MILLS, ROBERT D. - Instrument Engr., Baton Rouge, La.		B.'40, M'43
MORTON SALT COMPANY			
1.	CARLSON, LAWRENCE A. - Ass't. Plant Mgr., Silvers Spring, New York		B.'48
NORTH AMERICAN SOLVAY, INC.			
1.	DeLONG, C. R. - Vice President, New York, New York		B.'14
PATEKOL PRODUCTS, INC.			
1.	GEPHART, O. P. - Syracuse, Indiana		B.'15
PHILADELPHIA QUARTZ COMPANY			
1.	EMMONS, RUSSELL J., - Ind. Rel. Mgr., Philadelphia 6, Pennsylvania		M.'35
POTASH COMPANY OF AMERICA			
1.	SMITH, RANDAL E. - Chem. Engr., Carlesbad, New Mexico		
SINCLAIR VALENTINE COMPANY			
1.	GEORGE, ANTHONY - Chem. Engr., New York, New York		M.'22, D.'30
SPEPCO INC.			
1.	WALL, JAMES R. - Sales Engr., 314 Leo St., Dayton, Ohio		B.'24
WILLIAM GETZ CORPORATION			
1.	MILLER, ROBERT H. - Vice-President, Chicago, Illinois		B.'48
ADDRESSOGRAPH-MULTIGRAPH COMPANY			
1.	OVESEN, AXEL B. - 1200 Babbitt Road, Cleveland 17, Ohio		B.'40
AIR REDUCTION INC.			
1.	LITVIN, MILTON - Sr. Chem. Engr., 60 E. 42nd St., N.Y., N.Y.		M.'50
AMERICAN ZINC OXIDE COMPANY			
1.	MAIDENS, W. T., Supt., Columbus, Ohio		B.'16
2.	MILLER, GLENDON I. - Electrolytic Div., Monsanto, Illinois		B.'30
AMSCO SOLVENT COMPANY			
1.	BALLARD, RICHARD N. - Chem. Engr., Cincinnatti, Ohio		B.'47
ARMSTRONG CORK COMPANY			
1.	STEVENSON, ROBERT W. - Chem. Engr., Lancaster, Pennsylvania		B.'47
ATLAS POWDER COMPANY			
1.	FINCH, JOHN A. - Chem. Engr., Wilmington, Delaware		B.'40

B=Bachelor; M=Master; P=Ph.D.; C=Professional

EQUIPMENT, INSTRUMENT, ENGINEERING CONSTRUCTION CONSULTANTS, OWN BUSINESS AND RELATED WORK

	DEGREE AND YEAR
TAYLOR INSTRUMENT COMPANY	
1. FLIKKEMA, JOHN M., Field Engr., 30 Rochefeller Plaza, N.Y.30,N.Y.	B and M.'24
2. HOWARD, GEORGE E. - Mgr., Application Engr., Rochester, New York	B.'33
3. BERK, WILLIAM, JR. - Chem. Engr., Rochester, New York	B'46,M'50
4. ANDERSON, JAMES E. - Sales, Wilmington, Delaware	B.'50
5. VAN DAVEER, FREDERICK - Application Engr., Rochester, New York	B.'52
6. ZEITERS, GEORGE E. - Eng. Sales Trainee, 95 Ames St.,Rochester,N.Y.	B.'52
C. F. BRAUN AND COMPANY	
1. WALLIN, JOHN M. - 1000 Fremont Ave., Alhambra, Calif.	B'48,M'49
2. RITTER, R. B. - Project Engr., Alhambra, California	B. and M.'50
3. BOHNSLAV, ED - Proj. Engr., Alhambra, Calif.	B.'52
KELLOGG, M. W., CO.	
1. VORUM, DONALD A. - 6 Volschenk St., Vanderbiji Park, S.U.5, Transvaal - U. of S. Africa (74 Brutten St., Madison, New Jersey	M.'47 P.'51
2. DETAMORE, LOREN A. - Design Engr., New York, New York	B.'51
RALPH M. PARSONS COMPANY	
1. LAYFIELD, ELWOOD - Vice-President, Los Angeles 14, California	B'29,M'30
2. CHUTE, ANDREW E. - Chem. Engr., Los Angeles 14, California	B'37,M'39
BLAW KNO. CONST. COMPANY	
1. McKINNEY, DWIGHT D. - Principal Process Design Engr., Pitts,Pa.	B.'31
2. McCUBBIN, KEATOR - Vice-President, Chicago, Illinois (?)	B.'38
INFILCO, INC.	
1. EVANS, RICHARD R. - Sales Engr., Cleveland 30, Ohio	B.'48
2. MARTI, GEORGE - Sales Engr., Monroe, La.	B.'51
FLUOR CORPORATION, LTD.	
1. HOLMES, RICHARD E. - Piping Squad Leader, Houston, Texas	B.'35
2. BRICE, DONAT B. - Research Div., Whittier, California	P.'52
THE DORR OLIVER COMPANY	
1. LASSETER, FRANKLIN P. - Chem. Engr., Atlanta, Georgia	B.'25
2. MILES, HARRY V., JR. - Asst. Dir. of Research, Westport, Conn.	B.'36
F. M. de BEERS ASSOCIATION	
1. ENTWISLE, BEN - Engr. Sales, Chicago 6, Illinois	B.'51
INTERNATIONAL ENGINEERING, INC.	
1. CORRELL, MERLIN - Sales Engr., Akron 1, Ohio	M.'39
LIDELL ENGR. SERVICE	
1. SHAWD, EDGAR A. - Chem. Engr., Housten, Texas	B.'49
PRITCHARD AND ABBOTT ENGRS.	
1. HASELBARTH, JOHN E. - Valuation Engr., Houston 25, Texas	B.'48
MERCHANTS INDUSTRY, DAYTON, OHIO	
1. BECKER, WILLIAM J. - Const.Engr. and Op., Development, Medina,Ohio	M.'16
PRITCHARD, J. F. and CO. - ENGRS. AND CONTRACTORS	
1. LAUGHREY, PAUL W. - Mgr., Chem.Engr.Group, Kansas City, Mo.	B.'37

D=Bachelor; M=Master; P=Ph.D.; C=Professional

EQUIPMENT, INSTRUMENT, ENGINEERING CONSTRUCTION CONSULTANTS, OWN BUSINESS AND RELATED WORK

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
FOXBORO COMPANY			
1.	MOHLER, CLINTON A. - Branch Mgr., Knoxville, Tennessee		B.'42
BROWNE, FLOYD G. and ASSOCIATES			
1.	FISHER, WILLIAM R. - Chem. Engr., Galion, Ohio		B.'40
STAHL INDUSTRIES, INC.			
1.	STAHL, JOEL S. - Chem. Engr., Youngstown, Ohio		B.'39
BECKMAN INSTRUMENT COMPANY			
1.	ARTHUR, EDWIN P. - Chem. Engr., Fullerton, California		B.'22
BURRELL CORPORATION, PITTSBURGH, PENNSYLVANIA			
1.	BURRELL, GEORGE A. (DECEASED)		B.'06
MOJONNIER BROTHERS COMPANY			
1.	LIEDEL, HERBERT J. - Eastern Rep., Chicago		B.'20
NICHOLS ENGR. AND RESEARCH CORP.			
1.	STURZA, HERMAN L. - Sales Engr., New York, New York		M.'47
SARGENT, E. H., and COMPANY			
1.	MATEIA, EDWIN C. - Tech. Sales, Chicago, Illinois		Arts '19
GEORGE McCARTHY SALES, INC.			
1.	BIETERMAN, THOMAS E. - Sales Engr., Detroit, Michigan		B.'43
STONE and WEBSTER ENGR. CORP.			
1.	MASLYK, FRANK J. - Sr. Proc. Engr., Boston, Mass.		BA '30,C'54
WHITING CORPORATION			
1.	DOWNING, ALBERT R. - Chem. Engr., Swenson Evap., Whiting, Ind.		B.'39
BECHTEL CORPORATION			
1.	HALL, F. TIMOTHY - Proj. Engr., San Francisco, California		B.'42
ANDERSON CO., V. D.			
1.	BROESTL, EDWARD A. - Sales Engr., Cleveland 2, Ohio		B.'44,M.'46
TOLEDO SCALE COMPANY			
1.	HOFFMANNS, F. E. - Senior Engr., Maumee, Ohio		B.'42
DENISON ENGINEERING COMPANY			
1.	GRAY, HERBERT F. - Design Engr., Columbus 16, Ohio		B.'35
DAYTON PUMP AND MFG. COMPANY			
1.	EYERMAN, ALFRED M. - Dayton, Ohio		B.'25
SURFACE COMBUSTION CORPORATION			
1.	SUPOWIT, AARON J. - Asst. Proj. Engr., Columbus, Ohio		B.'48,M.'49
JANITROL DIVISION			
1.	SIDDLE, JOHN K. - Surface Combustion Eng. Dept., Columbus, Ohio		B.'45
GENERAL AMERICAN TRANSP. CORP.			
1.	CREHAM, WILLIAM T. - Asst. Vice-President, Chicago, Illinois		B.'35

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EQUIPMENT, INSTRUMENT, ENGINEERING CONSTRUCTION CONSULTANTS, OWN BUSINESS AND RELATED WORK

NO.	NAME AND POSITION IF KNOWN — DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
	ARTHUR McKEE	
1.	GEIER, JOHN D. - 2300 Chester Ave., Cleveland, Ohio	B'44,M'51
	HYDROCARBON RESEARCH, INC.	
1.	BALDING, CURTIS C. - Mgr.,Procurment and Construction, New York 16,NY	B.'25
	THOMAS, A. H., COMPANY	
1.	HALLER, ELDON D. - Consultant, West Washington Sq., Phil.,Pa.	B.'33
	PODBEILNIAK COMPANY	
1.	BAZELL, GRAYDON C. - Chem. Engr., Chicago, Ill.	B.'53
	POLAROID CORPORATION	
1.	CHUBB, LEWIS W., JR. - Res. Engr., Cambridge, Mass.	B.'32
	FOMAC ENGINEERS	
1.	GROVE, LEON K. - Chem. Engr., Houston, Texas	B.'33
	CONSULTING ENGINEERS	
1.	GUILLAVDEU, ARTHUR - Consultant, 6536 S. Campbell Dr.,Chicago,Ill.	B'10,M'11
2.	CORELL, ED - Consultant, 413 Rose Blvd., Akron, Ohio	B.'34
3.	MONTGOMERY, JAMES M. - 15 N.Oakland Ave.,Pasadena,Calif.	B.'20
4.	TURNER, NELSON C. - Consultant, 2626 Pemperton Dr.,Houston,Texas	B.'25
5.	URUETA, EDWARD A.-Consulting Engr.,Calle 68 No.59-09, Barranquilla, Columbia County, South America	B.'28
6.	WILKINSON, HOWARD - Consultant, Gates Mills, Ohio	C.'45
	UHLMAN ASSOCIATES	
1.	WHIRL, WILLIAM H. - Project Engr.,Columbus 14, Ohio	B.'24
	BACON AND DAVIS, ENGINEERS	
1.	WING, RALPH HERBERT - Chem. Engr., New York, New York	B'29,M'30
	GULF STATES SPECIALTIES COMPANY	
1.	MERCER, KENNETH K. - President, Houston, Texas	B.'43
	CLEVITE CORPORATION	
1.	FATICA, NICHOLAS - Chem. Consultant, Cleveland, Ohio	B.'37
	HUNTINGTON LAB., INC.	
1.	ANNAN, THOMAS P. - Sec'y - Huntington, Indiana	B.'21
	CONSULTING AND MFG. CHEMIST	
1.	BECKERT, CARL J. - Owner and Operator, Des Plaines, Illinois	B.'22
	SOUTHWESTERN ENGINEERING COMPANY	
1.	STALLKAMP, ALBERT - Chem. Engr., Los Angeles, California	B.'18
	THOMAS CHEMICAL COMPANY	
1.	THOMAS, FREDRICK L. - Director, Madison, Wisconsin	B.'35
	TECHNICAL ENTERPRISES, INC.	
1.	REDNESS, ALEXANDER - President, 31 South St., N.Y., N.Y.	M.'34
	SELF-EMPLOYED	
1.	HURWITZ, M. - Certified Public Accountant, 2087 Sherman Ave., Norwood 12, Ohio	B.'30

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FEDERAL GOVERNMENT

U.S.A.F. AIR RESEARCH AND DEVELOPMENT CMD., WRIGHT FIELD, OHIO

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
1.	KENNEDY, RICHARD R. - Chief Metals Branch Materials Lab		B.'20
2.	COTTER, ROBERT J. - Inspector, AMC		B.'22
3.	MICHAEL, LEWIS E. - Phys. Sc. Administrator, Aero. Res. Lab.		B.'34 M.'50
4.	WANDER, GARRETT LOUDON - Development Eng.		B.'38
5.	SCHELLER, KARL -		B.'39 M.'48
6.	BIERLEIN, JAMES A.		B.'42 M.'48 P.'51
7.	KELLEY, PAUL W		B.'46
8.	HEARN, JOHN W. JR., COL.		M.'47
9.	TERES, JULIUS - Chemist		M.'50
10.	WOLFSON, BERNARD T. - Res. and Develop. Engr.		M.'50
11.	SALZBERG, LEO F.		M.'50
12.	NORRIS, WILLIAM - Proj. Engr.		B.&M.'51
13.	KENIS, IVAN		M.'54
14.	DUNNAM, MARC		M.'48

ARMY

1.	OSBORNE, HAROLD G. - Lt. Col. (Retired) 330 Van Buren, Ft. Myers, Fla.	B.'22
2.	SCHEPP, DAVID G. - Lt. Col., Washington, D. C.	B.'32
3.	CASTO, CARL SAMUEL - Colonel, Arlington, Va.	B.'38
4.	HISER, CHARLES H. - Col.	
5.	TAYLOR, ALBERT LEAVITT - Major, Equipment Specialist, Engr.Main.Center	B.'38
6.	BOARDMAN, CHARLES H. - Major, H.Q. Armor Ctr., Chem. Sect., Ft.Knox, Ky.	B.'40
7.	BURCH, JACK P. - Major	B.'40
8.	WHITE, CLAUDE W. - Chief Special Weapons Div., Command and Staff, Lt. Col., Dept., U.S. Army Armor School, Ft. Knox, Ky.	M.'40
9.	THOMPSON, LOWELL E. - Lt. Col., Ft. Leavenworth, Kansas	B.'40 M.'47
10.	DUBES, RUSSELL F. - Pictorial Ctr., Long Island, N.Y.	w.'49
11.	LEE, WAYNE H. - Lt. Col.	M.'50
12.	STEPHAN, DAVID - Lt., Asst. San. Engr., U.S. Public Health Svc., Cincinnati, Ohio	B&M.'52 P.'55
13.	JUSTICE, RALPH -	B.'54
14.	MINDERMAN, PETER - Port Canaveral, Fla.	B.'54
15.	DREWYER, RICHARD A. - Lt., Camp Detrick, Md.	B.'55
16.	COX, HOWARD A. -	B.'55
17.	WEARY, SHERON E. - Chem. Corps, Ft. McClellan, Ala.	B.'56
18.	STORY, RICHARD N. -	B.'56

AIR FORCE

1.	EDDY, L. A. - Col., Albuquerque, N. Mex.	M.'47
2.	MOHR, CLIFFORD F. L. - Col., Asst. Chief of Op'rns, Materials Lab, W.P.A.F.B., Dayton, Ohio	M.'47
3.	TREXLER, CARL E. - Lt. Col., Dept. of Defense, Military Liaison Comm., P.O. Box 1814, Washington 13, D.C.	M.'47
4.	HILL, PRESTON - Col., Materials Lab, W.P.A.F.B., Dayton, Ohio	P.'50
5.	LINDSAY, J. T. - Captain, McClellan AFB, Sacramento, California	B.'51

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FEDERAL GOVERNMENT

NO.	NAME AND POSITION IF KNOWN DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
NAVY		
1.	LOVE, LELAND - Lt. Cmdr., Alexandria, Va.	B.'38
2.	HOPKINS, WILLIAM - Lt. Cmdr., Florida	B.'41
3.	LEETH, EARL D. - Lt. Cmdr., San Francisco, Calif.	B.'42
4.	MITCHELL, RICHARD D. - Naval Officer, F.P.O., N.Y.C., N.Y.	B.'44 M.'47
5.	COLLINS, RICHARD H. - Naval Officer (LCDR) NAS, Lincoln, Nebr.	w.'43
6.	DUVAL, ROBERT E. - Lt., Coronado, California	
7.	SCHRAMM, PAUL - DD836, USS McKenzie, F.P.O., San Francisco, Calif.	B.'52
8.	THOMAS, CHARLES W. -	B&M.'55
9.	HAERING, EDWIN R. - Ensign, Norfolk, Virginia	B&M.'56
10.	INMAN, BRYCE D. - Lt. Cmdr., Rm 3D873, Pentagon, Ofc. of Defense Secty.	B.'43

NAVAL ORDNANCE TESTING STATION

1.	COLES, HENRY L.	B.'12 M.'16 P.'31
2.	WILSON, JAMES - Design Engr., China Lake, Calif.	B.'22 M.'23
3.	KOONTZ, WILLIAM P. - Chem. Engr., China Lake, Calif.	B.'30 M.'32
4.	ORDAHL, DOUGLAS - China Lake, Calif.	M.'48
5.	MINNICH, BASIL H. - Hd. Chem. Process Branch, China Lake, Calif.	M.'49
6.	ALEXANDER, PAUL JR. - China Lake, Calif.	B.'56

ATOMIC ENERGY COMMISSION

1.	KELLER, CHARLES A. - Supt. Prod., Oak Ridge, Tenn.	B.'41
2.	LEHMAN, HUGH R. - Los Alamos, New Mexico	B.'41 M.'47
3.	MERRYMAN, ROY G. - Engr., Univ. of Calif., Los Alamos, N. Mex.	B.'41
4.	FISCH, HERBERT A. - Schenectady, N. Y.	B.'44 M.'48 P.'51
5.	STRAHL, CHARLES - Genl. Engr., Oak Ridge, Tenn.	B.'44
6.	ROGERS, JOHN D. JR. - Res. Engr., Los Alamos, N. Mex.	B.'47 M.'49 P.'50
7.	KRATZER, MYRON - Chem. Engr., Washington, D.C.	B.'47
8.	THOMAS, DAVID G. - Develop. Engr., Oak Ridge, Tenn.	B.'47 M.'48 P.'53
9.	CROFT, CLAUDE R. - Res. Chem.	B.'34

NATIONAL BUREAU OF STANDARDS

1.	HOLLER, HOMER D. -	M.'12 P.'17 C.'41
2.	MONG, LEWIS E. -	B.'27

BUREAU OF MINES

1.	CSERVENYAK, FRANK J. - Chief, Light Metals Br., Dept. of Interior, Washington, D.C.	B.'38
2.	FRIEDMAN, SAMUEL - Chem. Engr., 4800 Forbes St., Pittsburgh, Pa.	B.'39
3.	FIELDNER, ARNO C. - (Retired) Chief, Fuels & Explosives Svc.	B.'23
4.	KATZ, SIDNEY H. - (Retired) 774 Lower Ferry Rd., Trenton 8, N. Jer.	B.09 P.'27

B=Bachelor; M=Master; P=Ph.D.; C=Professional

FEDERAL GOVERNMENT

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR

OTHERS
1. KNIGHT, HARRY C. - Contract Coordinator, Army Chem. Center, Md. B.'09
2. CRAGG, R. H. - Asst. Chief Chem. Div., U.S. Tariff Comm., Washington, D.C. B.'14
3. BROOKS, DONALD B. - Automotive Engr., Office of Asst. Secty. of Defense, Res. and Dev., Pentagon, Washington, D.C. B.21 M.'23
4. CUPPLES, HOMER L. - Chemist, Beltsville, Md. B.21 M.'23 P.'24
5. KOEHNE, FRANK J. - Res. and Dev., Picatinny Arsenal, Dover, N.Jer. B.'24
6. COOK, FRANK E. - Bureau of Ships, Washington, D.C. M.'31
7. MARTIN, WILLIAM D. - Patent Examiner, U.S. Patent Ofc., Wash.D.C. B.'33 M.'34
8. LANCIA, HUMBERT C. - Chief, Classifications and Wage Admn. Bureau of Public Debt, Treasury Dept., Chicago, Ill. B.'34
9. GREEN, CHARLES E. - Superviso r Materials Engr., Ft. Belvoir, Va. B.'36
10. MARQUAND, C. B. - Exec. Dir., Advisory Council, Army Chem. Center, Md. B.'36
11. COFFMAN, BENJAMIN F. - Bureau of Aeronautics, Navy Dept. B.'37
12. LYON, SCOTT C. - U.S. Inf. Agency, Dept. of State, Wash.25, D.C. B.'34
13. WHITAKER, ROBERT T. - Chief Res. Br., Air Res. and Dev. Comm., Sun Bldg., Baltimore 1, Md. B.'37
14. MAYER, ARTHUR G. - Asso. Dir. of Prod., Naval Powder Factory, Indian Head, Md. B.'40
15. KLINE, HARLAN W. - Chief, National Ind. Engr. Div., Lake City Arsenal, Independence, Mo. M.'48
16. WHITE, W. C. O. - Research Chemist, QM. Genl., 2&T St., S.W., Washington, D.C. P.'39

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AVIATION AND RELATED INDUSTRIES

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
BENDIX AVIATION CORPORATION			
1.	CLEAVELAND, DEAN M. - Lubrication Engr.,	South Bend, Indiana	B.'23
2.	HOECKELMAN, RALPH F. -	Solid State Lab., Res. Lab. Div., Detroit 35, Mich	M.'53
BOEING AIRPLANE CO.			
1.	MEAD, ELWOOD - Assoc. Res. Engr.,	Plant 1, Seattle, Washington	M.'47
CALIF. INST. OF TECHNOLOGY (JET PROPULSION LAB.)			
1.	WALLACE, ALEXANDER E. - Senior Res. Engr.,	Solid Propellant Section, Jet Propulsion Lab., Calif.Inst. of Tech.,Pasedena, California	P.'45
CONSOLIDATED VULTEE AIRCRAFT CORP. (CONVAIR)			
1.	MIZISIN, ANDREW P. - Chem. Engr.,	San Diego, California	B.'51
LOCKHEED AIRCRAFT CORPORATION			
1.	MILLER, ROBERT N. - Engr. Specialist,	Aircraft Dev., Marietta, Ga.	B'36,M'41,P'48
THE GLENN L. MARTIN COMPANY			
1.	RAMEY, DENNIS L. -	Engr. Dept., Baltimore, Maryland	B.'37
2.	BARRON, SAUL -	Propulsion Section, Baltimore, Maryland	M.'48,P.'54
NORTH AMERICAN AVIATION, INC.			
1.	COOPER, FRANK M. - Sr. Res. Engr.,	Indlewood, California	B.'40
2.	GREENFIELD, S. P. - Asst. Group Leader,	Canoga Park, California	M.'42
3.	CLARK, DAVID N. - Sr. Engr.,	Columbus 16, Ohio	B.'44
4.	STREETT, LEROY P. - Ind. Engr.,	Columbus, Ohio	B.'47
5.	MOORE, HARRY LEE - Proc. Engr.,	Columbus, Ohio	B.'48
6.	HEINTZ, RICHARD P. - Group Leader, Chemical,	Columbus, Ohio	B.'49
7.	HOOVER, WILBUR C. - Research Eng. -	Columbus, Ohio	B.'49
THOMPSON AIRCRAFT PROD.			
1.	HOLMSTROM, P. O. -	Euclid 17, Ohio	B.'24
THIKOL CORPORATION			
1.	EILERMAN, RICHARD N. - Asst.Proj. Engr.,	Redstone Arsenel,Huntsville,Ala.	B.'51
2.	COX, HIRAM - Chem. Engr.,	Maryland	B.'5
3.	CORSO, CHARLES - Chem. Engr.,	Maryland	B.'5
REACTION MOTORS, INC.			
1.	GORDON, JOHN S. -	Chem. Dept., Denville, New Jersey	M.'56
ROCKETDYNE			
1.	SAVAGE, HUGH J. - Res. Engr.,	Canoga Park, California	B.'51,M.'57
N.A.C.A., Research Labs.			
1.	VOIT, CHARLES HENRY -	National Advisory Committee on Aeronautics, N.A.C.A., Research Labs., Cleveland, Ohio	B.'39

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MISCELLANEOUS COMPANIES

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
TITANIUM METALS CORPORATION			
1.	MADDEX, PHILLIP J. - Plant Mgr., Henderson, Nevada		B.'41
VIRGINIA SMELTING			
1.	DUNCAN, DANIEL W. - Vice-President, Norfolk, Virginia		M.'38,P.'41
2.	WYGAL, ROBERT J. - Supervisor, Norfolk, Virginia		B.'48
VULCAN DETINNING COMPANY			
1.	GOLDRICK, GORDON W. - Plant Supt., Gary, Indiana		B.'39
VULCAN STAMP AND MFG. COMPANY			
1.	SEABRIGHT, LAWRENCE - Chem. Engr., Elmwood, Illinois		B.'35,M.'37
WALLACE AND TIERNAN CO., INC.			
1.	FISCHER, F. P. (RETIRED) 64 Coveland Drive, Avon Lake, Ohio		B.'22
WALTER HUBER COMPANY			
1.	IRION, CLARENCE - Research Dir., 100 Gold St., New York, New York		B'20,M'22,P'35
WHITE DENTAL MFG. COMPANY			
1.	STROBACH, W. - Chief Chem. Engr., Staten Island, New York		B'27,M'49
WOLF, JACQUES AND COMPANY			
1.	PRANKE, EDWARD J. (RETIRED) - 7205 Zara Ave., Jacksonville 7, Fla.		B.'11
J. G. MILLIGAN COMPANY			
1.	GOODMAN, EARL - Chem. Engr., 10 S. 2nd St., Milwaukee, Wisconsin		B.'48
EX-CELLO COMPANY			
1.	HALL, HAROLD R. - Engr. Supervisor, Bluffton, Ohio		B'42
OIL REFINERY			
1.	HOELSCHER, ROLLIN L. - Oil Refinery, Princeton, Ind.		B'48
ZENITH FURNACE COMPANY			
1.	KECKLER, C. E. - Zenith Furnace Co., Duluth, Minnesota		B'19
CHEMICAL JOBBER			
1.	LOEB, EDWARD H. - Chem. Jobber, 7300 S. Shore Dr., Chicago, Ill.		B.'16
KILGORE MFG.			
1.	LONG, ROBERT - Kilgore Mfg., Westerville, Ohio		M.'49
POWER CO., c/o STEAM PLANT			
1.	ZIANTS, C. E. - Chemist, New Castle, Pennsylvania		B.'49
VITA-VAR CORPORATION			
1.	ZULANDT, ROBERT EDWARD - Asst. to Plant Mgr., 10 Commerce Court, Newark, New Jersey		B.'38
LINE MATERIAL COMPANY			
1.	ZWELLING, MARTIN - Chief Lab. Engr., Pershing Road, Zanesville, Ohio		B.'35
ARVIN INDUSTRIES, INC.			
1.	WINTERMUTE, GLENN E. - Chief Chem. Engr., 13th St., Columbus, Ind.		B.'42
COURTAULDS, INC.			
1.	WISE, HAROLD FRANKLIN - Section Leader, Research Dept., Mobile, Ala.		B.'37,M.'38
OHIO SEAMLESS TUBE COMPANY			
1.	Sales Metallurgist, 520 W. Eight Mile, Ferndale 20, Michigan		B.'19

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MISCELLANEOUS COMPANIES

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
	ENGINEERING ALLOYS DIGEST		
1.	WOLDMAN, NORMAN E. - President, 356 N. Mountain Ave, Upper Montclair, New Jersey		M.'22
	GOODMAN MANUFACTURING COMPANY		
1.	WIEGER, GEORGE E. - Metallurgist, Chicago 9, Illinois		B.'33
	MERRILL COMPANY		
1.	MAHAN, BOYD L. - Chem. Engr., San Francisco, California		M.'47
	NEWARK STOVE COMPANY (NEWARK, OHIO)		
1.	GAULKE, PAUL K. - Chem. Engr., Newark, Ohio		B.'43
	O. M. SCOTT AND SONS		
1.	HIGINBOTHAM, GARY B. - Chem. Engr., Marysville, Ohio		B.'52
2.	MOLL, GLENN L. - Chem. Engr., Marysville, Ohio		B.'55
	PENNA. INDUSTRIAL CHEM. COMPANY		
1.	ELLIOTT, FRED W. - Mgr. Tech. Sales, Clairton, Pennsylvania		M.'47
	R.C.A. VICTOR CORPORATION		
1.	EARHART, WILLIAM H. - Res. and Dev. Engr., Marion, Indiana		B.'35
2.	KIDD, MARSHALL C. - Research, Camden, New Jersey		B.'44
	UDYLITE CORPORATION (CHICAGO, ILLINOIS)		
1.	EGGER, GEORGE W. - Sales Engr., Chicago, Illinois		B.'49
	KEWANEE-ROSS CORPORATION		
1.	WILCOX, PAUL W. - Sales Engr., 1407 W. Avenue, Buffalo, New York		B.'36
	GENERAL TILE COMPANY		
1.	WILLIAMS, RAYMOND R. - Chem. Engr. Asst. Supt., El Segundo, Calif.		B.'42
	PAINT RESEARCH ASSOCIATES INC.		
1.	WALTON, WILLIAM T. - Dir. of Research, 1724 W 75 Place, Chicago, Ill.		M.'35
	PERMUTTIT COMPANY		
1.	VOSS, NORBERT A. - Sales Engineer, Houston, Texas		B.'36
	LINK BELT COMPANY		
1.	ULMER, P. F. - Chief Metallurgist, Indianapolis, Indiana		B.'31
	THE WATT CAR AND WHEEL COMPANY		
1.	WATT, H. H. - Vice-President, 309 E. Main St., Painesville, Ohio		B.'09
	INTERNATIONAL SHOE MACHINE CORP.		
1.	WEISZ, THOMAS A. - Water St. Plymouth, Mass.		B.'43

B=Bachelor; M=Master; P=Ph.D.; C=Professional

MISCELLANEOUS NON-CHEMICAL COMPANIES

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR

UNITED SHOE MACHINERY COMPANY
1. TOUCHMAN, WILLIAM S. - Chem. and Mech. Engr., Ohio Labs, Xenia, Ohio B.'37

WILLEY CARBIDE TOOL COMPANY
1. BLUMENTHAL, BEN - Detroit, Michigan B.'22

FINER'S JEWELRY
1. FINER, BENJAMIN - President and Owner, 249 State St., Carthage, N.Y. B.'33

FERGUSON AND LEE DRUG
1. FERGUSON, HARVEY M. - Grand Forks, North Dakota B.'19

MENENDAIN, K. A.
1. MENENDAIN, RAYMOND A. - Mgr., Columbus, Ohio B.&M.'35

REAL ESTATE AGENT
1. TEICHERT, CECIL O. - Real Estate Agent, Industrial, Columbus, Ohio B.'21

AGRICULTURE
1. MEYER, HAROLD A. - Producer of Farm Crops, Malinta, Ohio B.'36
2. MEYER, WILLIAM F. - (Retired) Owner of Fruit Farm, Brookville, Ohio B.'17

1. OUTCAULT, HARRY E. - Owner, House of Originals, Gift Shop, Carmel-by-the-Sea, California B.'17
1. ROESE, GEORGE E. - Glamour Gauge Co., 3169 Independence, Southgate, Calif. B.'39 M.'40
1. ROSENTHAL, JORGE C. - Co-Owner Fabrica De Productos Delta, Barranco, Lima, Peru B.'47
1. ROSINO, GILBERT G. - Owner, Rosino Shoe Store, Sandusky, Ohio B.'10
1. RUSSELL, HOWARD E. - Owner, Williamson Russell Furnace Co., Ashland, Ohio B.'20
1. SHAFFER, FRANCIS H. - Self Employed, Delaware, Ohio B.'10
1. SPENCER, CHARLES E. - Self Employed, Cedarville, Ohio M.'38
1. STONE, JULIUS D. - Stone Waldorf Grill, Toledo, Ohio B.'30
1. MORRIS, RICHARD E. - RFD #3, Poultry Farmer, Danville, New York B.'46
1. CHILD, RALPH K. - Washington Court House, Ohio B.'31,M.'32
1. JAMESON, RAYMOND A. - Merchant, 123 S. 3rd St., Hamilton,Ohio B.'16

PSYCHIATRIST
1. KATZ, G. HENRY - Psychiatrist, Penn Hospital, Phila, Pa. B.'20

HOLLENBACK PRESS (COLUMBUS,OHIO)
1. HOLLENBACK, RAND P. - Hollenback Press, Columbus, Ohio B.'21

PHYSICIAN
1. BOKER, H. A. - Physician - Put-In-Bay, Ohio B.'40, M.'46

STEVENSON COMPANY
1. ZEHN, ROBERT C. - Sales Engr., Stevenson Co., Wellsville, Ohio B.Met.E.'21

J. LEVY SONS, INC.
1. WUEST, ARTHUR ALBERT - Owner, J. Levy Sons, 6401 Salem Pike, Cinn,O. B'36,M'37

TRESSEL REALTY CORPORATION
1. TRESSEL, WILLARD F. - President, 3583 Fort St., Lincoln Park 25,Mich. B.'18

SALESMAN
1. VERT, C. E. - Salesman, Harness Business, Wapakoneta, Ohio B.'12

G. VANDERBORGH AND SON
1. VANDERBORGH, GEORGE H. - Native Blue Point Oysters, West Sayville, Long Island, New York P'27

MISCELLANEOUS NON-CHEMICAL COMPANIES

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
BALDWIN PIANO COMPANY			
1.	HENTHORN, DONALD L. - Chem. Engr., Cincinnati, Ohio		B.'42
BENNETT MANUFACTURING COMPANY			
1.	BENNETT, CHAS. R. - President (Deceased) Westerville, Ohio		B.15 M.'17
BRINKER AND BERNSDORF (Food Brokers)			
1.	BRINKER, H. W. - Partner (Retired) Columbus, Ohio		B.'12
CAMPGROUND GUIDE BOOKS (PUBLISHING COMPANY)			
1.	KLOTZ, ROBERT O. - Blue Rapids, Kansas		B.'25
CINCINNATI MILLING MACHINES COMPANY			
1.	RITTER, EDMOND J. - Dir. Cimcool Labs, Cincinnati, Ohio		B.'37
FRANK AND COMPANY, ZANESVILLE, OHIO			
1.	FRANK, SUMNER B. - (Deceased)		B.'11
F & F MOLD AND DIE WORKS, INC.			
1.	BRADEN, JOHN G. - Sales Mgr., Dayton 3, Ohio		B.'40
FEDERAL MACHINE AND WELDER CORPORATION			
1.	REHO, STEPHEN F. - Pipe Fitter, Warren, Ohio		B.'31
JOHN W. GALBREATH AND COMPANY			
1.	HORNE, JOHN W. - Salesman, Columbus, Ohio		B.'20
GRA-BELL FINANCE COMPANY			
1.	BELL, RODNEY A. - Secty.-Treasurer, Columbus, Ohio		B.'22
GRIFFIN GROCERY COMPANY			
1.	FREUDENBERG, H. J. - 111 South Cherokee, Muskogee, Oklahoma		B.'40
HILLTOP REALTY INC., DENVER, COLORADO			
1.	BOERSTLER, E. S. (Deceased)		B.'12
HOME DEPARTMENT STORE			
1.	BAILEY, JAMES A. - General Mgr., New Lexington, Ohio		B.'43
KROUSE TESTING MACHINES, INCORPORATED			
1.	BROOKS, HOWARD E. - Engr. of Tests, Columbus, Ohio		B.'30
LESCHEN AND SONS ROPE COMPANY			
1.	KILIAN, ROBERT M. - St. Louis, Mo.		B&M.'51
MUSIC MART			
1.	FOOTE, PHILIP M. - Owner, 79 Carnegie Hall, New York 19, N.Y.		B.'20
NATIONAL RECREATION ASSOCIATION			
1.	NESBITT, GEORGE A. - Dist. Rep., New York State		B.'19
OHIO THEATRE (NEW BOSTON, OHIO)			
1.	MALAVAZOS, JAMES C. - Owner, New Boston, Ohio(Suburb of Portsmouth)		B.'42
PENNSYLVANIA RAILROAD			
1.	STANTON, RAYMOND I. - Conductor, Columbus, Ohio		B.'35
O. H. PICKENPAUGH COMPANY			
1.	MERRY, MYRON E. - Office Mgr., Caldwell, Ohio		B.'47
REMINGTON-RAND INCORPORATED			
1.	KEENAN, PAUL B. - Salesman Photo Records Div., Washington, D.C.		w.'41
ROAD COMPANY, INCORPORATED			
1.	MOWEN, PAUL M. - Bookkeeper, Miami, Florida		B.'25
SEARS-ROEBUCK AND COMPANY			
1.	CASE, HENRY N. - (Deceased)		B.'13
2.	HENNINGER, F. R. - (Retired) 1206 Monroe Ave., River Forest, Ill.		M.'17
SERVICE HEATING AND PLUMBING COMPANY			
1.	HARRIS, VICTOR J. - Secretary, 20837 Lorain Rd., Cleveland 26, Ohio		B.'38
PHYSICIAN			
1.	FOSTER, ROBERT K., Physician, 1025 Orchard Lane, Franklin, Ind.		B'23,P'32,MD'35

B=Bachelor; M=Master; P=Ph.D.; C=Professional

MISCELLANEOUS NON-CHEMICAL COMPANIES

NO.	NAME AND POSITION IF KNOWN — DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
	EAU GALLIE COURT (MOTEL)	
1.	WAY, FREDERICK L. - Owner and Operator, 106 Pineapple Ave., Eau Gallie, Florida	B.'28
	OHIO VALLEY DAIRY AND PRODUCTS, INC.	
1.	WEISKIRCHER, SYLVESTER - 228 N. Court St., Steubenville, Ohio	B.'34
	ADVANCED TOOL STAMPING AND DIE CORPORATION	
1.	WEINBERG, H. - 642 East 5th Ave., Columbus, Ohio	B.'32,M'34
	CHEMICAL ABSTRACTS	
	BAKER, DALE, Associate Director,	B'42 M'48
	CAPELL, L.T., Nomenclature, Director and Executive Consultant	B.18

CITY AND MUNICIPALITIES

WATER SEWAGE AND MUNICIPAL

1.	SPERRY, WALTER - Supt., Aurora Illinois, Sanitary District	B.'07
2.	MCGUIRE, C. E. - Senior Chemist, Sewage Treatment, Col's.,Ohio	M.'11, C.'40
3.	SHENKER, SAMUEL - Water Purification Plant, Columbus, Ohio	BA'21, M.'26
4.	HUMASON, N. J. - Supt., Pumping and Filtration, Elyria Water Works, Lorain, Ohio	B.'21
5.	FISHBACK, A. L. - Public Health Engineer, Cuyahoga Falls,Ohio	B.'32
6.	RIEHL, M. L. - Supt., Water Purification, Youngstown, Ohio	B.'39
7.	RETZKE, ROY E. - Assoc. Engr., Sewage Treatment Plant,Akron,Ohio	B.'49
8.	FETTER, C. S. - Chemist, Purification Plant, Columbus, Ohio	B.'52
9.	LOWER, J. R. - Chemist, Bucyrus Water Works, Bucyrus,Ohio	B.'14

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EQUIPMENT, INSTRUMENT, ENGINEERING CONSTRUCTION CONSULTANTS, OWN BUSINESS AND RELATED WORK

NO.	NAME AND POSITION IF KNOWN	DIVISION, SUBSIDIARY OR DEPARTMENT	DEGREE AND YEAR
	PETER F. LOFTERS CORPORATION (CONSULTANTS)		
1.	COCHRAN, CHARLES B. - Vice-President, Pittsburgh, Pa.		B.'35 C.'40
	RAYON CONSULTANTS (JAPAN) LTD.		
1.	SCHMITZ, WILLIAM R. - President, Tokyo, Japan		BA'35, M'36
	CONSULTANT		
1.	OLNICK, JAY - Union Norte #55, Guadalajara, Jalisco, Mexico		M.'48
2.	WELLS, D.H. - Self-Employed, 74 Essex Road, Summit, N.J.		B.A.'18
	ROYAL LIVERPOOL GROUP (INSURANCE)		
1.	FLOOD, BERNARD E. - State Agent, Parkersburg, West Va.		B.'21
	NATIONAL FIRE INSURANCE COMPANY		
1.	WILKINSON, GEORGE H. - State Agent, Cleveland, Ohio		B.'22
	WARREN F. KIMBALL INSURANCE COMPANY		
1.	WALDRON, JOHN (Partner in the business) 90 John St., NY 30, NY		B.'21
	INDEPENDENT PATENT ATTORNEYS		
	TOULMIN AND TOULMIN		
1.	DRUMMOND, FOLSOM E. - Manager, Washington Office, Washington, D.C. (Patent Lawyer)		B.'24
	GREEN, PINELES AND DURR		
1.	DURR, FRANK L. - Patent Attorney, New York 16, New York		M.'29
	FISH, RICHARDSON AND NEAVE (PATENT ATTORNEYS)		
1.	HAMMETT, CHARLES E. JR. (DECEASED) Patent Attorney) Boston, Mass.		M.'27
	OHIO INSPECTION BUREAU		
1.	HAMILTON, ARTHUR J. - Engr., Ohio Inspection Bureau, Cleve., Ohio		B.'23
2.	LOTZE, WILLIAM A. - Supt., Ohio Insp. Bureau, Youngstown, Ohio		B.'21
3.	WRIGHT, THERON - Supt., Petroleum Properitics and Special Services, Columbus 16, Ohio		B.'23
	STATE OF OHIO		
1.	DUNN, FRED C. - Auditor, Franklin County		B.'15
2.	GRIMMER, LONE E. - Chem. Engr., Highway Dept. Testing Lab., Col's., O		B.'27
3.	ONG, ROBERT G. - Highway Dept., Columbus, Ohio		B.'35
4.	KOENIG, R. J. - Highway Dept., Columbus, Ohio		B.'49
5.	SHAFER, RICHARD D. - Air Pollution Engr., Dept. of Health, Col's, Ohio		M.'58
6.	CROOKS, HELEN S. - State Board of Health, Columbus, Ohio		B.'23
7.	HUFFMAN, DEAN D. - Ind. Hygiene Eng. Safety and Hygiene, Col's, Ohio		B.'30
8.	KEIFER, BENJAMIN - Ohio State Univ. Testing and Research Labs., Ohio State Univ. Campus, Columbus 10, Ohio		B.'33
9.	ADAMS, MARCELLUS M. - Engr. in Bituminus Mat. Sec., Highway Testing, Ohio State Univ., Columbus, Ohio		B.'30
	OHIO DEPARTMENT OF HEALTH		
1.	YEE, HONG TON - 6-1/2 S. Court St., Athens, Ohio		B'43, M'46
2.	WYNE, JAMES CLARENCE - Radiation Engr., State Office Bldg., Col's, O.		B.'43
3.	WUNDERLE, JACK A. - Consulting Engr., 101 N. High, Col's, 15, Ohio		B.'48

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E. I. DUPONT DE NEMOURS AND COMPANY [CONT'D.]

		DEGREE
102.	WEARY, EDWARD - Polychemicals Dept., Belle, West Virginia	B.'56
103.	CARPENTER, CHARLES N. - Polychemicals Dept., Parkersburg, W. Va.	B.'58
104.	COOKE, CLIFTON - Polychemicals Dept., Belle, West Virginia	B.'58
105.	LICHTENSTEIN, W. - Pigments Dept., Newport, Delaware	B.and M.'58
106.	NAGY, FRANK J. - Film Dept., Circleville, Ohio	B.'58

EQUIPMENT AND INSTRUMENT COMPANIES

INDUSTRIAL NUCLEONICS - COLUMBUS, OHIO

1.	SIMPSON, JAMES - Chem. Engr., Columbus, Ohio	B.'35
2.	FOLEY, DENNIS - Chem. Engr., Columbus, Ohio	B.'47,P.'54
3.	FREEH, EDWARD J. - Chem. Engr., Columbus, Ohio	P.'58

HENRY WEIS MANUFACTURING COMPANY - ELKHART, INDIANA

1.	McCUBBIN, KEATOR - President, Elkhart, Indiana	B.'38

UNITED GAS AND ENGINEERING - PHILADELPHIA, PA.

1.	SWEENEY, MAXWELL - Chem. Engr., Philadelphia, Pa.	M.'47

SUMMARY OF OHIO STATE UNIVERSITY CHEMICAL ENGINEERS CLASSIFIED BY INDUSTRY OR WORK FUNCTION

CHEMICAL COMPANIES

KOPPERS COMPANY (15); UNION CARBIDE CORPORATION (71)
E.I. DUPONT de NUMOURS AND COMPANY (106); GENERAL ELECTRIC COMPANY (27);
COLUMBIA SOUTHERN CHEMICAL CORPORATION(29); OLIN MATHIESON CHEMICAL CO.(26);
EASTMAN KODAK COMPANY (20); MONSANTO CHEMICAL CORPORATION (19);
DOW CHEMICAL COMPANY (18); AMERICAN CYANAMID COMPANY (16); PROCTOR AND GAMBLE(16)
ALLIED CHEMICAL AND DYE CORPORATION (15); DIAMOND ALKALI (12); INDUSTRIAL RAYON (7).
HOOKER ELECTROCHEMICAL COMPANIES (8); WYANDOTTE CHEMICAL COMPANY (9)
NATIONAL CASH REGISTER (8); FOOD MACHINERY (6) CHEMSTRAND CORPORATION (5)
HERCULES POWDER COMPANY (5); ETHYL CORPORATION (6); W.R. GRACE AND COMPANY
DAVISON CHEMICAL DIVISION (4); HAGAN CORPORATION -HALL LABORATORIES (4)
MALLINCKRODT CHEMICAL WORKS (4); THIKOL CORPORATION (3); BRUSH BERYLLIUM CO(2)
COLUMBUS COATED FABRICS CORPORATION (2); DOEHLER JARVIS CORPORATION(2)
DOW CORNING (2) EMERY INDUSTRIES (2) HILTON DAVIS CHEMICAL COMPANY (2)
ALLUMINUM COMPANY OF AMERICA (2); AMERICAN CREOSOTE COMPANY (1)
ANSUL CHEMICAL COMPANY (1); ARCHER-DANIELS-MIDLAND COMPANY (1)
ARMOUR AND COMPANY (1); ARMSTRONG CORK COMPANY (1); ATOMIC ENERGY COMMISSION (9)
ATOMICS INTERNATIONAL (1); ATLAS POWDER COMPANY (1); BAKER, J.T. & CO. (1)
BARNEBEY-CHENEY COMPANY (1); BELDING CORTICELLI (1); BRISTOL LAB, INC (1)
BRUSH BERYLLIUM COMPANY (2); CABOT CARBON COMPANY (1) CARBORUNDUM COMPANY (1)
CARY CHEMICAL COMPANY (1); CATALINE CORPORATION OF AMERICA (1)
CLEVITE CORPORATION (1) CLOROX CHEMICAL COMPANY (1); COLGATE-PALMOLIVE CO.(1)
COLUMBIAN CARBON (1); COMMERCIAL SOLVENTS CORP. (1); COURTAULDS, INC (1)
COWLES CHEMICAL COMPANY (1); A.B. DICK CO. (1); DRACKETT MANUFACTURING CO. (1)
E.F. DREW AND COMPANY, INC (1); FOOTE MINRAL COMPANY (1) FRONTIER CHEMICAL CO (2)
GLYCO CHEMICAL COMPANY (1); HARSHAW CHEMICAL COMPANY (3); HARWICH STANDARD
CHEMICAL COMPANY(1) INTERCHEMICAL CORPORATION (1); JEFFERSON CHEMICAL CO. (1)
KAISER ALUMINUM COMPANY (1); KELLEY ISLAND LIME AND RANSPORT CO (1)
KILGORE MANUFACTURING (1); KING POWDER COMPANY (1); LAKE ERIE PHARMACIAL (1)
MANGILL CHEMICAL COMPANY (1); MERRILL COMPANY (1); MINNESOTA MINING AND MANUFACTURING COMPANY (2) NARMCO RESINS AND COATINGS COMPANY (1); PENNA INDUSTRIAL CHEMICAL COMPANY (1) PERMUTTIT COMPANY (1); POLAROID-CORPORATION (1)
POTASH COMPANY OF AMERICA (1); PRITCHARD, J.F. and Co. (1); RAYONIER, INC (1)
TITANIUM METALS CORPORATION (1); UDYLITE CORPORATION (1); U.S.PHOSPHORIC PRODUCTS DIVISION (1); AMERICAN AGRICULTURAL CHEMICAL CO (1)
AMERICAN VISCOSE CORPORATION (1); AMERICAN ZINC OXIDE COMPANY (2)
AMSCO SOLVENT COMPANY (1); DIAMOND MATCH COMPANY (1) EAGLE-PICHER COMP.(1)
EX-CELLO CO(1); INTERNATIONAL MINERALS AND CHEM. CORP (1) IRONSIDES COMPANY (1)
JOANNA WESTERN MILLS (2) JOHNS-MANVILLE INTERNATIONAL CORP (1)
MEADOWBROOK CORPORATION (1); MERCK AND COMPANY (2); METAL AND THERMIT CORP (1)
NATIONAL DISTILLERS CHEMICAL CORPORATION (1); NATIONAL LEAD COMPANY (6)
NEW JERSEY ZINC (1); NORTH AMERICAN COAL CORPORATION (1); NORTH AMERICAN SOLVAY, INC (1); PATEKOL PRODUCTS (1); PHILADELPHIA QUARTZ CO (1)
REILLY TAR AND CHEMICAL CORP (2); O.M. SCOTT AND SONS (2); SHELLMAR PROD CO (1)
SINCLAIR VALENTINE CO (1); ST JOSEPH LEAD CO (1); TECHNICAL ENTERPRISE INC (1)
THOMAS CHEMICAL CO (1); WERK SOAP COMPANY (2); WOLF JACQUES AND CO. (1)
ARVIN INDUSTRIES, INC (1); PLUMER LEATHER CO (1); HEWITT SOAP CO INC (2);
PENNSYLVANIA SALT MANUFACTURING (1) GIBSON HOMANS COMPANY (1)
AIR REDUCTION INC (1); ALCO PRODUCTS INC (1); AMERICAN STANDARD (1)
AMERICAN POTASH AND CHEMICAL CORPORATION (3); VIRGINIA SMELTING (2)
RESI CHEMICAL CORPORATION (1) OHIO MATCH CO (1); FOSTER GRANT COMPANY Inc (1)
FRANKLIN GLUE COMPANY (2) GENERAL ANILINE (4); JOHNS MANSVILLE (1); ARGONNE LABORATORIES (1)

RUBBER AND CHEMICAL COMPANIES

B.F. Goodrich Company (46); GOODYEAR TIRE AND RUBBER (43); FIRESTONE TIRE AND RUBBER (17); U.S. RUBBER COMPANY (7) DAYTON RUBBER COMPANY (5); GENERAL TIRE AND RUBBER and (Aerojet)(8) TIRE REDUCING CORPORATION (1) BALDWIN RUBBER COMPANY (2); R.C.A. RUBBER COMPANY (ALSO ECLAT RUBBER (2) ACE RUBBER COMPANY (1); ACUSHNET PROCESS COMPANY (1) AMERICAN SYNETHETIC RUBBER (1) MANSFIELD TIRE AND RUBBER COMPANY (1) J.G. MULLIGAN COMPANY (1) OHIO RUBBER COMPANY (1); O'SULLIVAN RUBBER CORPORATION (1); PARA RUBBER CO. (1) PYRAMID RUBBER COMPANY (1); SPONGE RUBBER CORPORATION OF AMERICA (1) DELURIK SHOWER CO. (1); MAC GREGOR GOLF AND SPORT PRODUCTS INC (1);

PETROLEUM, PETRO-CHEMICALS AND RELATED INDUSTRIES

STANDARD OIL OF INDIANA (20)
SHELL OIL COMPANY AND CHEMICAL (21); SOCONY MOBIL AND SOCONY VACUUM OIL CO. (12) STANDARD OIL COMPANY OF NEW JERSEY (19) SOHIO CHEMICAL COMPANY (13) PHILLIPS PET. (8) LUBRIZOL CORPORATION (6); STANDARD OIL OF CALIFORNIA (6); PURE OIL COMPANY (6) ATLANTIC REFINING COMPANY (5); SUN OIL COMPANY (5); ASHLAND OIL AND REFINING (4) AMERICAN OIL COMPANY (Pan American Refinery) (3) TEXAS COMPANY (3); UNION OIL COMPANY OF CALIFORNIA (6); AMERICAN BITUMUIS AND ASPHALT COMPANY (2); GULF OIL COMPANY (2); OHIO OIL COMPANY (3); PETROLITE CORPORATION (2) SKELLY OIL CO. (2); ARABIAN-AMERICAN OIL COMPANY (1); CONTINENTAL OIL CO. (1); DAURA REFINERY (1); CROWN OIL PRODUCTS COMPANY (1); DUPERIAL. S.A. (1); GENERAL PETROLEUM COMPANY (1); HOUDRY PROCESS COMPANY (1); HYDROCARBON RESEARCH , Inc (1); LION OIL COMPANY (1); MAGNOLIA PETROLEUM CORPORATION (1); OIL REFINERY, Princeton, Ind (1); PLANET OIL AND REFINING COMPANY (1); CALIFORNIA TEXAS OIL COMPANY (1) REMMINGTON ARMS COMPANY (1); SINCLAIR RESEARCH LABS Inc (3) PONTIAC REFINING CORP. (1) RICHFIELD OIL CORP (1)

PULP, PAPER, CONTAINERS AND RELATED INDUSTRIES

MEAD CORPORATION (13);
WEST VIRGINIA PULP AND PAPER COMPANY (6); UNION BAG AND PAPER CO. (2); GARDNER BOARD AND CARTON COMPANY (2); IMPERIAL PAPER AND COLOR CO. (1); MORAINE PAPER COMPANY (1); NATIONAL NEWSPRINT AND PAPER MILLS (1); OHIO BOXBOARD COMPANY (2); OXFORD PAPER COMPANY (1) RAYONIER INC (1); SORG PAPER COMPANY (1); ST.REGIS PAPER COMPANY (1); EYERHAEUSER TIMBER CO (1); BRUNSWICK PULP AND PAPER COMPANY (3) CHAMPION PAPER AND FIBER CO (3) CROWN ZELLERBACH CORPORATION (1); CRYSTAL TISSUE COMPANY (1); HANKINS CONTAINER Co(1) EASSON, INC (1); FIBERBOARD PAPER PRODUCTS Inc (1); WILLIAM GETZ CORPORATION (1)

PAINT, LACQUER, PIGMENTS, VARNISH AND RELATED INDUSTRIES

GLIDDEN COMPANY (6); SHERWIN-WILLIAMS COMPANY (4); HANNA INDUSTRIAL FINISHER (2) HILTON-DAVIS CHEMICAL COMPANY (2); DE VOE AND REYNOLDS COMPANY (2) ST JOSEPH LEAD COMPANY (1); ACHESON DISPERSED PIGMENT COMPANY (1); CINCINNATI VARNISH COMPANY (1); DEPENDABLE HARRIS PAINTS (1) EAGLE-PICHER CO. (1) FITZPATRICK BROTHERS INC (1); INTER CHEMICAL CORPORATION (1) LACQUER PRODUCTS (1) LILLY VARNISH COMPANY (1); O'BRIEN CORPORATION (1); FREY YENKIN PAINT CO (1) FEDDERS-QUIGAN CORPORATION (1); FARBOIL PAINT COMPANY (1) HAMPTON PAINT (1) WOOSTER FINISHES CORPORATION (1); PAINT RESEARCH ASSOC (1) WALTER HUBER CO (1), FITZPATRICK BROTHERS INC (1); VITA VAR CORPORATION (1);

FIRE UNDER WRITERS INSPECTION BUREAUS INSURANCE AND RELATED COMPANIES

NATIONAL BOARD OF FIRE UNDERWRITERS (2) FACTORY INSURANCE ASSOCIATION (2); NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY (2); FIREMAN'S FUND INSURANCE CO (1) HARTFORD FIRE INSURANCE COMPANY (1); CONNECTICUT MUTUAL LIFE INSURANCE CO (1) CONRAD AND MUELLER, INC (1); EMPLOYERS' MUTUAL LIABILITY INSURANCE COMPANY (1) AMERICAN INSURANCE CO (1); EQUITABLE LIFE INSURANCE COMPANY (1) INSURANCE COMPANY OF AMERICA (1) MANUFACTURES MUTUAL FIRE INSURANCE CO (1) MUTUAL INSURANCE COMPANY (1) NORTH BRITISH AND MERCANTILE INSURANCE CO (1) HOME INSURANCE CO (1); ROYAL LIVERPOOL GROUP INSURANCE (1); WARREN KIMBALL INSUR. (1) OHIO INSPECTION BUREAU (3);

FOOD STARCH SALT AND OTHER AGRICULTURAL AND RELATED PRODUCTS

NATIONAL STARCH PRODUCTS (6); NESTLES INC. (6); STANDARD BRANDS INC (3) ARMOURAND COMPANY (2); CAPITAL CITY PRODUCTS (1); DIAMOND CRYSTAL-COLONIAL SALT Co. (2) GENERAL FOODS CORP. (2); KEEVER STARCH CO (1); THOMAS J. LIPTON CO (1) STALEY, A.E MANUF. Co (1); COLLIERVILLE DAIRY PRODUCTS CO (1) MORTON SALT CO (1) HAWAIIAN PINEAPPLE CO (1);

THE GLASS INDUSTRY

OWENS-CORNING FIBERGLASS CORPORATION (7); OWENS-ILLINOIS GLASS COMPANY (6); LIBBEY-OWENS-FORD GLASS COMPANY (5); CORNING GLASS WORKS (1) DUPLATE CORPORATION (1); LAMB GLASS COMPANY (1); PITTSBURGH PLATE GLASS (1) MAYWOOD GLASS COMPANY (1) ANCHOR HOCKING GLASS CO (1); PENNSYLVANIA GLASS SAND CORP (1);

METALLURGICAL INDUSTRIES

U.S. STEEL CORPORATION (16); REPUBLIC STEEL CORPORATION (11); ARMCO STEEL CORP (6)
INTERLAKE IRON CORPORATION (3); JONES LAUGHLIN (2); WIERTON STEEL CO. (2); FERRO Corp
CRUCIBLE STEEL COMPANY OF AMERICA (1); WHEELING STEEL CORPORATION (1);
YOUNGSTOWN SHEET AND TUBE COMPANY (1); INLAND STEEL CORP (2); KALSEY-HAYES CO (1)
MARION IRON AND METAL COMPANY (1); PRESSED STEEL TANK CORPORATION (1);
METAL AND THERMIT CORP. (1); LUKENS STEEL CO. (1); OHIO SEAMLESS TUBE CO (1);
SECRODS CO. (1); VULCAN DETINNING CO (1); VULCAN STAMP AND MFG Co (1);
THE WATT CAR AND WHEEL CO(1); CRUCIBLE STEEL CO of AMERICA (1); KALSEY-HAYES Co (1)
INTERNATIONAL NICKEL COMPANY (1); FERROTHERM CO (1); GOODMAN MANUF Co (1)
TIMKEN ROLLER BEARING CO (3) HOBART BROTHERS (2)

CERAMIC, LIME AND CONSTRUCTION MATERIALS AND RELATED COMPANIES

U.S. GYPSUM COMPANY (5); BASIC REFRACTORIES, INC (2);
U.S. STONEWARE COMPANY (2); FERRO CORPORATION (2); DURIRON CO. (2);
NATIONAL LIME AND STONE CO (1); OHIO HYDRATE AND SUPPLY CO (1)
KELLEY ISLAND LIMEAND TRANSPORT CO (1) MARBLEHEAD LIME CO (1)
KNIGHT, MAURICE A. COMPANY (1); BRUSH POTTERY CO (1); GENERAL REFRACTORIES CO (1)
FERROTHERM COMPANY (1); COHART REFRACTORIES CO (1); MASONITE CORPORATION (1)
McKAY COMPANY (1); GENRAL TILE COMPANY (1) OHIO HYDRATE AND SUPPLY CO (1);
NORTON COMPANY (1);

AUTOMOTIVE INDUSTRIES

GENERAL MOTORS CORPORATION (26); FORD MOTOR COMPANY (1) CHRYSLER CORPORATION (1);

EQUIPMENT AND INSTRUMENT COMPANIES

AIR PRODUCTS (2); BABCOCK WILCOX (3); AMERICAN METER COMPANY (1);
CHEMINEER, INC (2); GIRDLER CORPORATION (2); INFILCO, INC (2) U.S. STONEWARE CO. (2)
CUTLER HAMMER, INC (1); THE GRISCOM-RUSSELLCOMPANY (1)
JANITROL DIVISION (1); JEFFERY MANUFACTURING COMPANY (1); HERRICK JOHNSON INC (1);
KEWANEE-ROSS CORPORATION (1); KNIGHT, MAURICE A., Company (1);
LINDBERG ENGINEERING COMPANY (1); LINK BELT COMPANY (1); MONONNIER BROTHER CO (1)
MYERS, F.E. and BROS CO (1); H.H. ROBERTSON COMPANY (2); TAYLER CORPORATION (1);
WHITING CORP (1); INDUSTRIAL NUCLEONICS (3); UNITED GAS AND ENGINEERING (1);
HENRY WEIS MANUFACTURING COMPANY (1)

CHEMICAL CONSTRUCTION COMPANIES

C.F. BRAUN AND COMPANY (3); KELLOG,M.W., Co (2); RALPH M. PARSONS CO (2);
BLAW KNOX CONST COMPANY (2); FLUOR CORPORATION, LtN (2);
SOUTHWESTERN ENGINEERING CO (1);

PHARMACEUTICALS AND RELATED INDUSTRIES

PARKE-DAVIS COMPANY (10)
ABBOTT LABORATORIES (2); SQUIBB COMPANY, (2); AMERICAN PHARMACEUTICAL CO (1);
BRISTOL LAB., Inc. (1); LAKE ERIE PHARMACAL INC (1): ELI LILLY AND CO; (1)
PFIZER AND COMPANY, CHAS (1); PITMAN-MOORE COMPANY (1); STERLING DRUG, INC; (1);
UPJOHN COMPANY (1);

RESEARCH INSTITUTES

BATTELLE (38); SOUTHWESTERN RESEARCH INST (2); MELLON INSTITUTE (10:
DENVER RESEARCH INSTITUTE (1); GULF COAST RESEARCH INST. (1)
PROCESS RESEARCH INC (1); LOUISVILLE INSTITUTE IND. RESEARCH (1)

WATER SEWAGE AND MUNICIPALITIES

NEW YORK AND PENNSYLVANIA CO Inc. (1) Various engineers in purification plants in various cities in Ohio (9)

UTILITIES AS GAS ELECTRIC AND STEAM POWER PLANTS

APPALACHIAN POWER COMPANY (1); CINCINNATI GAS ELECTRIC CO (1);
DETROIT EDISON COMPANY (1); DUQUESNE LIGHT COMPANY (1); EL PASO NATIONAL GAS CO (1)
POWER CO NEW CASTLE STEAM PLANT (1); AMERICAN GAS ASSOCIATION LABORATORIES (1);

STATE OF OHIO

OHIO DEPARTMENT OF HEALTH (3) WALLACE AND TIERNAN CO (1)
STATE of OHIO (Highway dept., auditor, Industrial Hygiene and Safety etc) (9)

ELECTRICAL COMPANIES

SYLVANIA ELECTRIC PRODUCTS INC (3); WESTINGHOUSE ELECTRIC CORPORATION (3) RCA VICTOR (2)
ERIE REGISTOR CORPORATION (1); HOTPOINT INC (1); LINCOLN ELECTRIC CO (1)
LINE MATERIAL COMPANY (1); RESISTANCE WELDES CORPORATION (1); SHOCKLEY SEMI-CONDUCTOR LABORATORY (1); SURBURBAN COMPANY (1); GENERAL ELECTRIC CO.. (27);

PATENT ATTORNEYS

PATENT ATTORNEYS INDEPENDENT (3)

FEDERAL GOVERNMENT

U.S.A.F. AIR RESEARCH AND DEVELOPMENT WRIGHT FIELD, OHIO (14) ARMY 8)
AIR FORCE (5) NAVY (10); NAVAL ORDNANCE TESTING STATION (6); ATOMIC ENERGY COMM. (9)
NATIONAL BUREAU OF STANDARDS (2); BUREAU OF MINES (4); VARIOUS OTHERS (16);
ROCKY MOUNTAIN ARSENAL (1)

MISCELLANEOUS NON CHEMICAL COMPANIES

CLEVELAND GRAPHITE BRONZE (1); NEWARK STOVE COMPANY (1); PERFECT CIRCLE COMPANY (1).
ROYAL TYPEWRITER COMPANY (1); SEARLE, G.D. and CO (1); SPEPCO INC (1);
STROMBERG-CARLSON CO (1); SUNBEAM CORPORATION (1); SUNNEN PRODUCTS (1);
WHITE DENTAL MFG COMPANY (1); WILLIAMS, GEORGE L. Company (1);
ADDRESSOGRAPH MULTIGRAPH CO. (1); COLUMBUS PIPE AND EQUIPMENT CO (1);
HEATING ENGINEER (1); HO-PAR INC (1) ; INTERNATIONAL SHOE MACHINE CORP (1);
IOWA METHODIST HOSP (1) ANACONDA WIRE AND CABLE COMPANY (1) DUBOIS COMPANY INC (1)

TEACHING

UNIVERSITIES (53); HIGH SCHOOL (10); FOREIGN TEACHERS (9)

EDITORIAL CHEMICAL ABSTRACTS

ENGINEERING ALLOYS DIGEST (1)

AVIATION AND RELATED COMPANIES

NORTH AMERICAN AVIATION INC (7); THIKOL CORPORATION (3); THE GLENN L MARTIN CO (2)
BENDIX AVIATION CORPORATION (2); BOEING AIRPLANE CO (1); CALIF INST OF
TECHNOLOGY (JET PROPULSION LAB (1) CONSOLIDATED VULTEE AIRCRAFT CORP (1)
LOCKHEED AIRCRAFT CORPORATION (1); THOMPSON AIRCRAFT PROD (1); REACTION MOTORS INC (1)
ROCKETDYNE (1) N.A.C.A. RESEARCH LABS (1); BRULIN AND COMPANY INC (1)

CONSULTING TECHNICAL LABS INDEPENDENT CHEMICAL BUSINESS SALES REPRESENTATIVE

BETZ LABORATORIES INC (1); CHEMICAL JOBBER (1); CONSULTANTS (OWN BUSINESS) (4)
HOME PRODUCTS INTERNATIONAL (1); LIDELL ENGR, SERVICE (1); MARGAR COMPANY (1);
PERMAFLEX MOLD COMPANY (1); UHLMAN ASSOCIATES (1);

MISCELLANEOUS INDEPENDENT NON CHEMICAL COMPANIES

TOOL COMPANIES, JEWELRY, DRUG STORE, RUG COMPANY AND RUG CLEANER, REAL ESTATE, FARMERS, GIFT SHOP, SHOE STORE, FURNACE CO, PIPE, CLOTHING STORE, COUNTY AUDITOR, GROCERY MERCHANT, FOOD BROKER, COMMUNITY PAPER AND PRINTING, PHYSICIANS, OYSTER COMPANY, TAVERN, DRESS SHOP, PIANO, GUIDE BOOKSFOR CAMPING, WOOD WORKING, FINANCE COMPANY, ROPE, MUSIC MART (CARNEGIE HALL), PHOTO RECORDS, RAILROAD CONDUCTOR, HOTEL AND THEATRE OWNER, MOTEL OWNER, RECREATION ASSOCIATION, SERVICE HEATING, HARNESS BUSINESS, PSYCHIATRIST. ALUMINIUM AWNINGS, FORMS, and WINDOWS, etc..

TOTAL 56

DECEASED CHEMICAL ENGINEERING ALUMNI

(Number in Parenthesis indicates number of graduates that year)

1907 (6)

1. Harry R. Drackett
2. Harry E. Surface
3. Dana J. Demorest

1908 (5)

1. Frank M. Dorsey
2. Charles P. Hoover
3. Paul McDorman
4. Arthur C. Nothstine, Jr.

1909 (6)

1. Erwin Sohn
2. O. R. Sweeney

1910 (7)

1. Ernest Holman Grant
2. William Durbin Lareaux
3. W. A. Richey
4. Lear Harry VanBuskirk

1911 (10)

1. Harry V. Atkinson
2. Sumner Baer Frank
3. Roscoe Conklin Jones
4. Clarence Roscoe King

1912 (11)

1. E. S. Boerstler
2. F. J. Montgomery

1913 (11)

1. Henry Newson Case
2. Albert N. Erickson (?)
3. Charles Raymond Parkinson
4. Reuben Lloyd Walter

1914 (19)

1. Emil Harold Balz
2. W. T. Burgoon
3. Paul Cottringer
4. A. A. Chambers
5. Roy Davis Fritz
6. L. A. Gregg
7. Edward Gilbert Hines
8. Brice Stewart Hull
9. Lesley Stahl Jenkins
10. Arthur R. Willis

1915 (20)

1. C. R. Bennett
2. Walter M. Berger
3. Ralph Peter Heikes
4. H. L. Dick
5. Carl W. Simpson
6. J. W. Melick

1916 (16)

1. M. A. Muskopf
2. Hanford A. Thirey

1917 (20)

1. Carl E. Aungst
2. Walter L. Krueger
3. William A. Wirth
4. D. F. Alexander

1918 (18)

1. G. A. Burrell
2. Aubrey E. Hess
3. Garland H. Hufford
4. Edwin Wade Mann
5. H. Alton Mitchell
6. J. M. Ort
7. A. H. Vilbrandt

1919 (7)

1. Howard F. Anders
2. J. G. Ralston

1920 (32)

1. Haney C. Howell
2. Louis John Mathies Jr.
3. Roy Pastor
4. Victor J. Roehm
5. Harold T. Reiner-Ruff
6. Carroll L. Strait
7. Joseph M. Volzer

1921 (29)

1. Walter F. Spear

1922 (33)

1. Paul R. Hines
2. Walter J. Klaiber
3. Roland M. Kohr
4. R. E. Wolfe
5. R. E. Whinnery

1923 (60)

1. R. T. Donham
2. Albert G. Corwin
3. James T. Goff
4. William J. Harrison

1924 (28)

1. Carroll M. Allen
2. Raymond S. Carter
3. John LeRoy Ware
4. C. Weis

1925 (35)

1. Lorin E. Lutz
2. Fredrick H. MacLaren
3. Adolph Valley

1926 (14)

1. J. L. Thoma (W'26)

1927 (19)

1. Charles E. Hammett
2. Dwight S. Masters
3. Edwin F. Nussdorfer
4. Charles Robley Owens

1928 (19)

1. Thomas C. Chadwick

1929 (24)

1. James Pace Alton
2. Ming Tan Hsieh

1930 (34)

1. G. B. Malvea
2. K. M. Sprinkel

1931 (43)

1. T. W. Elslager
2. Adolph Wassertheurer

1932 (40)

1. Conrad F. Daum
2. David M. Goodfriend
3. Alfred E. Galloway
4. E. C. Piotter

1933 (42)

1. Francis E. Pickering

1935 (66)

1. Harvey C. Gillogly

1936 (42)

1. Robert Leroy Scroggs

1937 (53)

1. Richard M. Abbott
2. Clare O. Ewing, Jr.
3. Leon W. Omwake
4. William C. Shank

1938 (71)

1. D. J. Gaston (W'38)
2. Howard J. Orlowski

1939 (66)

1. Alexander Newhouse

1940 (73)

1. John Robert Linn

DECEASED CHEMICAL ENGINEERING ALUMNI

1942 (67)
1. Vaughn E. Kelly
2. Julian Adam Yocum

1943 (90)
1. M. F. Dick

1945 (14)
1. Roland Leroy Allen
2. Charles John Speitz, Jr.

1949 (132)
1. Thomas Orlo Feasel
2. John William Shook, Jr.

1951 (103)
1. Turney Ferguson
2. John R. Seferian

1953 (45)
1. Abd Ali Muhammad Al-Kazimi

1955 (57)
1. Fred Curt Ohnmeiss

LOST, STRAYED OR STOLEN ALUMNI IN CHEMICAL ENGINEERING

In Parenthesis (A) means we have an Address, but don't know if it's correct or not.
In Parenthesis (AI) means we got their address out of the A.I.Ch.E. Directory.

IF YOU KNOW THE ADDRESS OF ANY OF THESE, WE WOULD APPRECIATE IT VERY MUCH IF YOU WOULD INFORM US.

1910
1. C. G. Wood, M.Sc.

1911
2. C. J. Burkley

1912
3. William Nelson Lorentz
4. Richard Reeves Rigby (A)

1913
5. James Walter Bowen - M.A.'13
6. Karl Fred Dunkel (A)
7. A. N. Erickson
8. A. C. Perrin
9. Frederick Clayton Smith

1915
10. G. D. Evans
11. Harry Mitzen

1916
12. W. J. Becker - M.Sc.

1917
13. W. J. King - M.Sc.
14. Earl R. Schafer
15. En-Fou Lee-Toma - M.'22

1918
16. Albert Stallkamp

1919
17. C. C. Keckler

1920
18. S. A. Koogle
19. Yu Seng Tsen - M.'20

1921
20. C. H. Case
21. V. D. Campbell
22. C. M. Evans
23. R. D. Kumajon (Formely Osgerichian)
24. Kao Shen
25. Robert C. Zehn

1922
26. K. A. Cover
27. V. R. Morris
28. Chang Yuen Pang
29. Marion C. Reed - M'22

1923
30. A. F. Acosta
31. H. M. Davies
32. W. L. Lonsway
33. W. H. Miller - M.'23
34. Ying Lam Pun - Ph.D.'23

1924
35. Tien I. Chen - M.'24

1925
36. M. T. Metz
37. Chennan Shen
38. C. M. Sun - M.'25

1926
39. F. C. Davis
40. Mao Han Tuan

1927
41. Cheung Ying Chu - M.'27
42. R. H. Collins
43. Wei Yang - M.'28, Ph.D. '30

LOST, STRAYED OR STOLEN ALUMNI IN CHEMICAL ENGINEERING (CONT'D.)

1928

44. W. H. Cochran - W.'28
45. Yun Hao Feng Hsung - M.'28, Ph.D. '31
46. Chieh Ma. - M.'28, Ph.D. '30

1931

47. H. W. Almen (A)

1932

48. Frederick L. Mueller

1933

49. Robert V. Cobb - W.'33
50. D. H. Gardner (A)

1934

51. Charles Whang Choi - Ph.D. '34
52. Theodore Marks
53. W. A. Menges
54. W. F. Swink
55. Raymong Tseng - Ph.D. '34
56. Robert Work

1935

57. Clarence Eugene Irion - Ph.D. '35
58. W. M. Losh - M.'35
59. Lee E. Kleinmaier (AI)
60. E. C. Painter
61. Mrs. Chi K. Leung Tom - M.'35

1936

62. Walter Charles Lorenz
63. J. E. Plumer

1937

64. Aaron Gordon

1938

65. Edward Joseph Haven - M.'38
66. Paul Lenz - M.'38
67. L. W. Love
68. R. F. McCormick - B.'38, M.'39
69. James McHugh - W.'38
70. F. E. Miller

1939

71. W. O. White - Ph.D.'39
72. Robert Dewart - (A)

1940

73. Jack P. Burch
74. Henry Jay Jacoby - B.'40, M.'41

1941

75. P. P. Grebus, Jr.
76. W. A. Hopkins
77. Robert K. Lawson
78. R. G. Merryman (A)

1942

79. W. E. Houser (AI)
80. J. C. Houston
81. E. M. Jacobson

1943

82. B. D. Inman
83. Donald E. Morgan (A)
84. J. K. Siddle (A)
85. Augustus R. Van Kleeck - M.'49, (A)

1944

86. John P. Geier
87. Herman P. Kackenmester (A)
88. Charles Strahl (A)

1945

89. Michael A. Bobal (A) - M.'45, Ph.D.'47

1946

90. Lloyd D. Treleaven (A)
91. J. W. Walter (A)

1947

92. Robert H. Bullard (A) - W.'47
93. Valeb Khamneizadeh - M.'47
94. Paul H. Lenhart
95. B. L. Mahan - M.'47
96. Sidney Miller - M.'47
97. W. O. Stauffer
98. Raymond F. Uber
99. L. A. Dunham (A)
100. Herman L. Sturza (A) - M.'47
101. R. E. Wells (A)
102. E. L. Pascal (AI) - M.'47

1948

103. En-Tsch Ming - M.'48, Ph.D. '51
104. G. P. Manos
105. W. R. Meredith (A)
106. A. J. Supowit (A) - M.'49

1949

107. Huan Yan Hsung - M.'49
108. Chi-Ti Pan
109. Charles R. Shepherd
110. Robert C. Dunn - M.'49 (A)

1950

111. John Chocholak - M.Sc. '50
112. R. E. Duval - M.Sc. '50
113. Robert C. Johnston - M.Sc. '50
114. Charles D. Lindberg
115. Wayne H. Lee - M.'50
116. Leo F. Salzberg - M.Sc. '50
117. Earl C. Sumner (A)
118. Harold Leo Stelzer - M.Sc. '50 (A)
119. Robert B. Ritter - B. and M.Sc.'50 (AI)
120. B. Rubin - M.'50

1951

121. Raymond C. Beckett
122. M. L. Davis - M.Sc. '51
123. Charles L. Dornbusch
124. Rai Tsing Lee - M.Sc. '51
125. James Patrick Slattery
126. Charles L. Newton
127. Andrew P. Mizision (AI)

LOST, STRAYED OR STOLEN ALUMNI IN CHEMICAL ENGINEERING (CONT'D.)

1952

128. M. O. Abdullah - B.and M.'52
129. Robert F. Aldrich (A)
130. Ed Bohnslav - (A)
131. Roy Choudhury - M.Sc. '52
132. Clayton S. Fetter
133. Richard Sudak - M.'52 (AI)
134. Frank Rummel - (AI)

1954

135. Richard Edward Harrington
136. George J. Hsieh - W.'54
137. F. J. Maslyk - Prof.Degree '54 (A)
138. Robert H. Nimitz (AI)

1955

139. Richard Arthur Drewyer
140. Charles J. Corso (A)
141. Hiram Cox (A)

1956

142. Robert W. Chute - W.'56
143. Raja Faris Hajjar - M.'56

1957

144. Hugh James Savage - M.'57 (A)
145. Robert Throckmorton - B.and M.'57 (A)
146. William F. Taylor - M.'57 (A)

TWO LOST ALUMNI AND DO NOT KNOW YEAR OF GRADUATION

147. C. B. Marquand - ? (A)
148. E. E. Martin - B. (?)

ADDITIONAL LOST ALUMNI

1926

149. Toh Liu - Ph.D. '26
150. Cho Wu - B.Ch.E. '26

1927

151. Harry W. Huang - M.'27, Ph.D.'30

1931

152. Yi Ou-Yang - M.'31, Ph.D.'33

1932

153. S. C. Yang - Ph.D. '32

1934

154. Wei Chieh Hsieh - Ph.D. '34

1935

155. W. I. Liao - Ph.D. '35

1938

156. Tse Kao Wu - M.'38, Ph.D.'41

1948

157. Lan Ching Wang - M.Sc. '48

SUMMARY

1: DECEASED ALUMNI - 116

2: LOST ALUMNI - FOREIGN MOSTLY CHINESE WHO ARE IN COMMUNIST CHINA - - - 26

3: LOST ALUMNI WE HAVE AN ADDRESS FOR BUT DO NOT KNOW WHETHER IT IS CORRECT OR NOT - 32

4: LOST ALUMNI - ADDRESS FROM A.I.Ch.E. DIRECTORY - - - - - - - - - - - 9

5: LOST ALUMNI - NO ADDRESS - NO CLUES - - - - - - - - - - - - - - - - - - 90

TOTAL OF LOST ALUMNI - - - - - - 157

THE OHIO STATE UNIVERSITY CHEMICAL ENGINEERING DEGREES CONFERRED, 1906 to DATE

YEAR	B.Ch.E	BChE-MSc	M.Sc.	Ph.D.	Ch.E.	Total	
1906	2					2	
1907	6					6	8
1908	5					5	13
1909	6					6	19
1910	6		1			7	26
1911	10					10	36
1912	11					11	47
1913	10		1			11	58
1914	17		2			19	77
1915	18		2			20	97
1916	14		2			16	113
1917	17		3			20	133
1918	14		1	2	1	18	151
1919	6		1			7	158
1920	25		6	1		32	190
1921	21		7	1		29	219
1922	24		8	1		33	252
1923	44		5	8	3	60	312
1924	18		5	5		28	340
1925	28		6	1		35	375
1926	9		4	1		14	389
1927	12		4	2	1	19	408
1928	11		5	3		19	427
1929	15		7	2		24	451
1930	21		6	7		34	485
1931	25		10	7	1	43	528
1932	22		13	5		40	568
1933	24		11	4	3	42	610
1934	25		4	4	1	34	644
1935	42		15	2	7	66	710
1936	28		10	1	3	42	752
1937	35		13	3	2	53	805
1938	46		20	2	3	71	876
1939	42		18	6		66	942
1940	56		11	6		73	1015
1941	52		14	5		71	1086
1942	61		4	2		67	1153
1943	82		3	4	1	90	1243
1944	24		3			27	1270
1945	8		3	3		14	1284
1946	14		5	2		21	1305
1947	57		66	1		124	1429
1948	86		58	4		148	1577
1949	80	1	40	9		130	1707
1950	53*	17	30	19		119	1826
1951	58*	25	20	19	1	123	1949
1952	57*	11	9	9		86	2035
1953	29*	10	12	6		57	2092
1954	21*	4	5	4	1	35	2127
1955	21*	4	2	4		31	2158
1956	19*	7	10	4		40	2198
1957	21*	9	13	4		47	2245
1958	30*	5	6	5	2	48	2293
TOTAL	1488	93	504	178	30	2293	

* ASLO INCLUDES BACHELOR'S DEGREE CONFERRED UPON STUDENTS IN COMBINED PROGRAM

DISTRIBUTION CHEMICAL ENGINEERING ALUMNI BY STATES

Alabama	7	Nebraska	1
Arizona	1	Nevada	3
Arkansas	1	New Jersey	74
California	73	New York	146
Colorado	6	New Mexico	5
Connecticut	13	North Carolina	6
Delaware	37	North Dakota	2
Florida	20	Ohio	653
Georgia	9	Oklahoma	9
Idaho	1	Oregon	1
Illinois	75	Pennsylvania	72
Indiana	52	South Carolina	10
Iowa	4	South Dakota	2
Kansas	6	Tennessee	18
Kentucky	16	Texas	57
Louisiana	14	Virginia	37
Maine	2	Washington	10
Maryland	22	Washington, D. C.	11
Massachusettes	13	West Virginia	58
Michigan	72	Wisconsin	11
Minnesota	4	Wyoming	1
Mississippi	4		
Missouri	20		

FOREIGN COUNTRIES

Argentina	2	Hawaii	1
Australia	1	India	11
Canada	5	Iraq	3
Canal Zone	1	Japan	3
China	14	Puerto Rico	1
Columbia	2	Peru	2
Egypt	1	Phillipines	1
England	2	Turkey	1
Finland	1	Mexico	2
Formosa	1	British West Indies	1
Germany	4		

COLLEGE OF ENGINEERING ENROLLMENT - AUTUMN 1957

	First Year	Second Year	Third Year	Fourth Year B.S.	Fourth Year M.S.*	Fifth Year B.S.	Fifth Year M.S.*	TOTALS
Aeronautical	76	62	49	37	10	24	2	248
Agricultural	**35	**31	**22			5	1	6
Architecture	51	49	33	45		18		196
Ceramic	10	8	10	7	1	7	3	42
Chemical- 1957	72	62	48	39		21	5	242
" 1956	89	66	47	29		19	10	260
" 1955	85							221
" 1954	79	48						206
" 1953	75	48	41					183
" 1952	51	43	30	23				149
" 1951	39	27	22	18		24		172
" 1950	29	28	24	22		21		211
Civil	68	51	31	52	5	35	9	237
Electrical	173	174	132	131		36	2	646
Industrial	19	45	43	68	1	43	4	219
Landscape A.	4	3	4	6		2		19
Mechanical	126	136	120	108		73	1	563
Metallurgy	14	13	18	14	2	21		80
Mining	2	5	7	3	1	3		20
Petroleum	5	15	10	8		7	2	45
E. Physics	19	34	14	18	3	1	7	86
Welding	2	7	8	11		7		35
Undecided	309	33	5			1		348
TOTALS (1957	951	697	532	547	*23	305	*36	3032

Irregular		72
Special		1
Transient		1
Graduate (5th Year M.Sc.)		35
Twilight	Regular 222 Wright Field 35	257
Marion		33
Newark		13
Grand Total -		3444

* Included in 4th or 5th year B. S. columns

** Registered in College of Agriculture, not included in Engineering totals

DEPARTMENT OF CHEMICAL ENGINEERING
LIST OF STAFF MEMBERS, FELLOWS, SCHOLARS, AND RESEARCH FOUNDATION STAFF

1957 - 1958

I. PROFESSORS

1. Joseph H. Koffolt (Chairman)
2. Webster B. Kay
3. Edward V. O'Rourke
4. Aldrich Syverson
5. Peter O. Krumin

II. ASSOCIATE PROFESSORS

1. Thomas H. Kerr (Emeritus)
2. Christie J. Geankoplis
3. Charles E. Dryden
4. Hartzel Slider
5. Edwin E. Smith

III. ASSISTANT PROFESSORS

1. Waldron D. Sheets
2. Robert S. Brodkey

IV. INSTRUCTOR

1. Clyde H. Kearns, Jr.

V. DUPONT POSTGRADUATE TEACHING ASSISTANTSHIP

1. Edward J. Freeh

VI. ASSISTANT

1. James Leslie

VII. GRADUATE ASSISTANTS

1. William J. Asher
2. Lloyd G. Jones
3. Donald Kerrigan
4. Jon H. Lee
5. Richard J. Shafer
6. Wolf R. Vieth

VIII. STUDENT ASSISTANT

1. Byron Shark

IX. SECRETARY

1. Clara Hatzer

X. STENOGRAPHERS

1. Carolyn Bennett
2. Joan Beutler
3. Betty A. Wilford

XI. MECHANIC

1. Keldon Latham

XII. FELLOWSHIPS

1. American Cyanamic -
2. Battelle Memorial Inst.-J.M.Skaates
3. Dow Chemical - Larry Jordan
4. Eastman Kodak - William H. Seaton
5. Esso Research and Engineering - Glenn Leverett
6. G. E. Educational-Charitable Fund- Arthur W. Liles
7. Linde Company - Div. of U.C.C.- Davis P. Macarus
8. Procter and Gamble - Ed McAdam
9. Shell Oil - James McMicking

XIII. SCHOLARSHIPS

1. Chemstrand Corporation
2. Cincinnati Milling and Machine - Gerald A. Wilcox and L. R. Steele
3. Dow Chemical - Phil Gifford III.
4. Goodyear - Sanford G. Bloom
5. Lubrizol Corporation - Dan M. Hayes and Don Wilhelm
6. National Carbon - James Lacksonen
7. Standard Oil Company of Ohio - John Birle and James Facer
8. Union Carbide Chemicals - James Kanyok and Al Krock

XIV. RESEARCH ASSOCIATES - RESEARCH FOUNDATION

1. Professor L. K. Herndon
2. Felice J. Celli
3. Marian M. Derfer
4. Christoph J. Grundmann
5. Ehrenfried H. Kober
6. Gerhard Ottmann
7. Hansjuergen A. Schroeder
8. Sigrid Seide
9. Willy Schnabel
10. Rudi Raetz
11. Henri Ulrich

XV. RESEARCH ASSISTANT-RESEARCH FOUNDATION

1. Joyce Coleman

XVI. ENG. EXPT. STATION ASSISTANT

1. Foo-Heng Tse

XVII. SECRETARIES - RESEARCH FOUNDATION

1. Lieselotte Mieth
2. Helen L. Palmer

LIST OF GRADUATES IN CHEMICAL ENGINEERING 1957-1958

(Source--Chemical Engineering Faculties 1957-1958. Prepared by the Chemical Engineering Education Projects Committee. Edited by Kenneth A. Kobe, Professor, Chemical Engineering, University of Texas. Published by the American Institute of Chemical Engineers.)

* After a school's name indicates that it is not accredited.
S After name indicates a State School.

NAME OF SCHOOL	B.Ch.E. or B.S.	M.Sc. or M.Engr.	B.Ch.E. M.Sc.	Ch.E.	Ph.D. or D.Sc.	TOTAL
ALABAMA						
1. University of Alabama (S)	17	2				19
2. Alabama Polytechnic Inst. (S)	34					34
ARKANSAS						
3. University of Arkansas (S)	17					17
CALIFORNIA						
4. Univ. of California (LA) (S)	20	5			1	26
5. Univ. of California (Berkeley(S)	36	6				42
6. Univ. of Southern California (*)	13	5				18
7. California Inst. of Technology	9	13		1	4	27
8. San Jose State College (*) (S)	6					6
9. Stanford University (*)	23	2				25
COLORADO						
10. University of Colorado (S)	36	2			1	39
11. University of Denver (*)	3					3
CONNECTICUT						
12. Yale University	23	3			6	32
DELAWARE						
13. University of Delaware (S)	15	9			6	30
DISTRICT OF COLUMBIA						
14. The Catholic Univ. of America(*)	3					3
FLORIDA						
15. University of Florida (S)	28	5				33
GEORGIA						
16. Georgia Institute of Technology	55	5			1	61
IDAHO						
17. University of Idaho (S)	19	3				22
ILLINOIS						
18. Univ. of Illinois (S)	36	12			5	53
19. Northwestern University	34	10			2	46
20. Illinois Inst. of Technology	30	12			2	44

NAME OF SCHOOL	B.Ch.E. or B.S.	M.Sc. or M.Engr.	B.Ch.E. M.Sc.	Ch.E.	Ph.D. or D.Sc.	TOTAL
INDIANA						
21. University of Notre Dame	40	4				44
22. Indiana Technical College (*)	21					21
23. Purdue University (S)	130	15			4	149
24. Tri-State Coll. of Engineering and Commerce (*)	22					22
25. Rose Polytechnic Institute	18					18
IOWA						
26. State University of Iowa (S)	18	4				22
27. Iowa State College (S)	38	3			4	45
KANSAS						
28. Kansas State College (S)	20	3				23
29. University of Kansas (S)	22	4			1	27
KENTUCKY						
30. University of Kentucky (S) (*)						0
31. Univ. of Louisville Speed Scientific School	19	12				31
LOUISIANA						
32. Tulane University (S)	14	1				15
33. Louisiana State University (S)	44	11			2	57
34. Southwestern Louisiana Inst. (S)	6					6
35. Louisiana Polytechnic Inst. (S)	14					14
MAINE						
36. University of Maine (S)	24	10	2**			36
MARYLAND						
37. University of Maryland (S)	13				1	14
38. The Johns Hopkins University (*)	14	2			5	21
MASSACHUSETTS						
39. University of Massachusetts (S)(*)	18					18
40. Northeastern University	32					32
41. Mass. Inst. of Technology	75	106		2	7	190
42. Tufts University	14					14
43. Worcester Polytechnic Inst.	32	4				36
MICHIGAN						
44. University of Michigan (S)	73	59			18	150
45. Michigan State University (S)	30	1			1	32
46. Michigan College of Mining and Technology (S)	30	1				31
47. University of Detroit	19					19
48. Wayne State University (S)	10	5				15
MINNESOTA						
49. University of Minnesota (S)	7***	7	21****		7	42

** BS--Paper Chemistry, 5 Years
*** BS--4 Years
**** BS--5Years

NAME OF SCHOOL	B.Ch.E. or B.S.	M.Sc. or M.Engr.	B.Ch.E. M.Sc.	Ch.E.	Ph.D. or D.Sc.	TOTAL
MISSISSIPPI						
50. Mississippi State College(S)(*)	13					13
51. University of Mississippi (S)	10	2				12
MISSOURI						
52. School of Mines&Metallurgy (S)	35					35
53. University of Missouri (S)	16	5				21
54. Washington University	23	1			4	28
MONTANA						
55. Montana State College (S)	13	4				17
NEBRASKA						
56. University of Nebraska (S)	19	3				22
NEW HAMPSHIRE						
57. University of New Hamp. (S) (*)	22	2				24
NEW JERSEY						
58. Princeton University	15	6				21
59. Stevens Inst. of Technology (*)		9				9
60. Newark College of Engineering	57	35				92
NEW MEXICO						
61. New Mexico College of Agricultural & Mech. Arts (S) (*)	9					9
62. University of N. Mex. (S) (*)	14					14
NEW YORK						
63. The City College of New York	85					85
64. New York University	43	13			1	57
65. The Cooper Union	26					26
66. Columbia University	23	16			5	44
67. Pratt Institute	6					6
68. Polytechnic Inst. of Brooklyn	63	14			5	82
69. Clarkson College of Technology	27	1				28
70. Cornell University	34	3			3	40
71. Rensselaer Polytechnic Institute	77	4			1	82
72. University of Rochester	21	1			1	23
73. Syracuse University	11	9			2	22
NORTH CAROLINA						
74. North Carolina State College (S)	24	6			3	33
NORTH DAKOTA						
75. University of North Dakota	9					9
OHIO						
76. Ohio State University (S)	16	9	6		5	36
77. University of Cincinnati	28	3			2	33
78. Case Inst. of Technology	37	6			1	44

NAME OF SCHOOL	B.Ch.E. or B.S.	M.Sc. or M.Engr.	B.Ch.E. M.Sc.	Ch.E.	Ph.D. or D.Sc.	TOTAL
Ohio (Cont'd)						
79. University of Dayton (*)	14					14
80. Fenn College	6					6
81. The University of Toledo (*)	13					13
82. Ohio University (S) (*)						0
OKLAHOMA						
83. Oklahoma State University (S)	25	2			1	28
84. University of Oklahoma (S)	29	4				33
85. The University of Tulsa (*)	8					8
OREGON						
86. Oregon State College (S)	21	2			1	24
PENNSYLVANIA						
87. Pennsylvania State Univ. (S)	54	2			3	59
88. Carnegie Inst. of Technology	45	12			6	63
89. Univerity of Pittsburgh	36	4			2	42
90. University of Pennsylvania	18	6				24
91. Bucknell University	8					8
92. Lafayette College	20					20
93. Drexel Inst. of Technology	30	2				32
94. Lehigh University	43	2				45
95. Villanova University	21	4				25
96. Grove City College (*)	17					17
RHODE ISLAND						
97. University of Rhode Island (S)	15	3				18
SOUTH CAROLINA						
98. Clemson Agricultural College (*)	13					13
99. University of S. Carolina (S)	10					10
SOUTH DAKOTA						
100. South Dakota School of Mines and Technology (S) (*)	5					5
TENNESSEE						
101. Vanderbilt University	18	2				20
102. Univ. of Tennessee (S)	18	6			6	30
TEXAS						
103. Agric.&Mech. College of Tex.(S)	34	1				35
104. University of Texas (S)	56	9			3	68
105. Texas College of Arts and Industries (S) (*)	4					4
106. Texas Tech. College (S) (*)	20					20
107. Lazar State Coll. of Tech. (S) (*)	1					1
108. University of Houston	9					9
109. The Rice Institute	28**	2	24***		2	56

--B.A. 4 Yrs.; *--B.S. 5 Yrs.

NAME OF SCHOOL	B.Ch.E. or B.S.	M.Sc. or M.Engr.	B.Ch.E. M.Sc.	Ch.E.	Ph.D. or D.Sc.	TOTAL
UTAH						
110. Brigham Young University (*)	16					16
111. University of Utah (S)	15				1	16
VIRGINIA						
112. Virginia Polytechnic Inst. (S)	21	6			3	30
113. University of Virginia (S)	8					8
WASHINGTON						
114. State College of Washington (S)	9	2				11
115. Univ. of Washington (S)	37	10			7	54
116. Seattle University (*)	6					6
117. Gonzaga University (*)	5					5
WEST VIRGINIA						
118. West Virginia University (S)	25	7			3	35
WISCONSIN						
119. University of Wisconsin (S)	80	11			4	95

SUMMARY

	STATE	PRIVATE	
B.Ch.E. or BS	1453	1458	
M.Sc. or M.Engr.	264	333	
B.Ch.E. and M.Sc.	29	24	
Ch.E.	0	3	
Ph.D.	91	62	
TOTAL	1837	1880	3717

No of State Schools = 59
No of Private Schools = 60

ALPHABETICAL INDEX OF COMPANIES EMPLYING OHIO STATE CHEMICAL ENGINEERS

No.	NAME OF COMPANY	NUMBER EMPLOYED.	PAGE NUMBER
234	ABBOTT LABORATORIES	2	36
53	ACE RUBBER COMPANY	1	14
79	ACHESON DISPERSED PIGMENT COMPANY	1	16
131	ACUSHNET PROCESS COMPANY	1	22
351	ADDRESSOGRAPH-MULTIGRAPH COMPANY	1	42
409	AIR FORCE	5	46
168	AIR PRODCUTS, INC.	2	28
352	AIR REDUCTION INC	1	42
305	ALCO PRODUCTS INC.	1	40
4	ALLIED CHEMICAL AND DYE CORPORATION	15	2
304	ALUMINUM COMPANY OF AMERICA	2	40
169	AMERICAN AGRICULTURAL CHEMICAL COMPANY	1	28
170	AMERICAN BITUMUIS AND ASPHALT COMPANY	2	28
186	AMERICAN CAN COMPANY	3	31
167	AMERICAN CREOSOTE COMPANY	1	28
2	AMERICAN CYANAMID COMPANY	16	2
157	AMERICAN GAS ASSOCIATION LABORATORIES	1	27
103	AMERICAN INSURANCE COMPANY	1	17
166	AMERICAN METER COMPANY	1	28
163	AMERICAN OIL COMPANY (Pan American Refinery)	3	28
235	AMERICAN PHARMACEUTICAL COMPANY	1	36
164	AMERICAN POTASH AND CHEMICAL CORPORATION	3	28
306	AMERICAN STANDARD	1	40
54	AMERICAN SYNTHETIC RUBBER COMPANY	1	14
213	AMERICAN VISCOSE CORPORATION	1	33
353	AMERICAN ZINC OXIDE COMPANY	2	42
354	AMSCO SOLVENT COMPANY	1	42
132	ANACONDA WIRE AND CABLE COMPANY	1	22
162	ANCHOR HOCKING GLASS COMPANY	1	28
383	ANDERSON COMPANY	1	44
3	ANSUL CHEMICAL COMPANY	1	2
156	APPALACHIAN POWER COMPANY	1	27
7	ARABIAN-AMERICAN OIL COMPANY	1	5
307	ARCHER-DANIELS-MIDLAND COMPANY	1	40
165	ARMCO STEEL CORPORATION	6	28
215	ARMOUR AND COMAPNY	1	34
355	ARMSTRONG CORK COMPANY	1	42
408	ARMY	18	46
446	ARVIN INDUSTRIES, INC	1	50
8	ASHLAND OIL AND REFINING	4	5
187	ATLANTIC REFINING COMPANY	5	31
356	ATLAS POWDER COMPANY	1	42
412	ATOMIC ENERGY COMMISSION	9	47
247	ATOMICS INTERNATIONAL	1	37
528	ARGONNE NATIONAL LABORATORIES	1	1

No.	NAME OF COMPANY	NUMBER EMPLOYED	PAGE NUMBER
308	BABCOCK WILCOX	3	40
398	BACON AND DAVIS, ENGINEERS	1	45
248	BAKER, J. T. and COMPANY	1	37
133	BALDWIN RUBBER COMPANY	2	22
334	BARNEBEY-CHENEY COMPANY	1	41
203	BASIC REFRACTORIES, INC.,	2	32
134	BATTELLE MEMORIAL INSTITUTE	38	23
382	BECHTEL CORPORATION	1	44
374	BECKMAN INSTRUMENT COMPANY	1	44
249	BELDING CORTICELLI	1	37
417	BENDIX AVIATION CORPORATION	2	49
309	BETZ LABORATORIES, INC	1	40
361	BLAW KNOW CONSTRUCTION COMPANY	1	43
418	BOEING AIRPLANE COMPANY	1	49
358	BRAUN, C.F. AND COMPANY	3	43
236	BRISTOL LAB., INC	1	36
372	BROWNE, FLOYD G. AND ASSOC	1	44
335	BRULIN AND COMPANY, INC	1	41
193	BRUNSWICK PULP AND PAPER COMPANY	1	32x
336	BRUSH BERYLLIUM COMPANY	2	41
205	BRUSH POTTERY COMPANY	1	32
414	BUREAU OF MINES	4	47
375	BURRELL CORPORATION	1	44
250	CABOT CARBON COMPANY	1	37
419	CALIFORNIA INSTITUTE OF TECHNOLOGY (Jet Propulsion)	1	49
9	CALIFORNIA TEXAS OIL COMPANY	1	5
216	CAPITAL CITY PRODUCTS	1	34
251	CARBORUNDUM COMPANY	1	37
310	CARY CHEMICAL COMPANY	1	40
39	CATALINE CORPORATION OF AMERICA	1	8
25	CHAMPION PAPER AND FIBER COMPANY	3	6
441	CHEMICAL JOBBER	1	50
40	CHEMINEER, INC.	2	8
212	CHEMSTRAND CORPORATION	5	33
44	CHRYSLER CORPORATION	1	9
158	CINCINNATI GAS ELECTRIC COMPANY	1	27
80	CINCINNATI VARNISH COMPANY	1	17
311	CLEVELAND GRAPHITE BRONZE	1	40
400	CLEVITE CORPORATION	1	45
252	CLOROX CHEMICAL COMPANY	1	37
37	COHART REFRACTORIES COMPANY	1	8
124	COLGATE-PALMOLIVE COMPANY	1	21
312	COLLIERVILLE DAIRY PRODUCTS COMPANY	1	40
313	COLUMBIAN CARBON	1	40
34	COLUMBIA SOUTHERN CHEMICAL CORPORATION	29	8
253	COLUMBUS COATED FABRICS CORPORATION	2	37
314	COLUMBUS PIPE AND EQUIPMENT COMPANY	1	40
38	COMMERICAL SOLVENTS CORPORATION	1	8
99	CONNECTICUT MUTUAL LIFE INSURANCE COMPANY	1	17
100	CONRAD AND MUELLER, INC	1	17
420	CONSOLIDATED VULTEE AIRCRAFT CORP	1	49
402	CONSULTING AND MANUFACTURING CHEMIST	1	45
521	CONSULTANTS OWN THEIR OWN BUSINESS	4	55
529	CHEMICAL ABSTRACTS	2	54

no.	NAME OF COMPANY	NUMBER EMPLOYED	PAGE NUMBER
396	CONSULTING ENGINEERS	6	45
10	CONTINENTAL OIL COMPANY	1	5
226	CORNING GLASS WORKS	1	35
447	COURTAULDS, INC	1	50
254	COWLES CHEMICAL COMPANY	1	37
11	CROWN OIL PRODUCTS COMPANY	1	5
2 6	CROWN ZELLERBACH CORPORATION	1	6
141	CRUCIBLE STEEL COMPANY OF AMERICA	1	24
27	CRYSTAL TISSUE COMPANY	1	6
36	CUTLER HAMMER, INC	1	8
12	DAURA REFINERY	1	5
386	DAYTON PUMP AND MFG COMPANY	1	44
129	DAYTON RUBBER COMPANY	5	22
365	deBEERS & F.M. ASSOC	1	43
197	DEERFILED GLASSIVE COMPANY	1	32
55	DeLURIK SHOWER COMPANY	1	14
385	DENISON ENGINEERING COMPANY	1	44
138	DENVER RESEARCH INSTITUTE	1	23
81	DEPENDABLE HARRIS PAINTS	1	16
160	DETROIT-EDISON COMPANY	1	27
91	DEVOE AND REYNOLDS COMPANY	2	16
225	DIAMOND ALKALI	12	35
217	DIAMOND CRYSTAL-COLONIAL SALT COMPANY	2	34
257	DIAMOND MATCH COMPANY	1	37
337	DICK, A.B. COMPANY	1	41
244	DOEHLER JARVIS CORPORATION	2	36
364	THE DORR OLIVER COMPANY	2	43
255	DOVER CHEMICAL CORPORATION	1	37
171	DOW CHEMICAL COMPANY	18	29
172	DOW CORNING COMPANY	2	29
256	DRACKETT MANUFACTURING COMPANY	1	37
338	DREW, E.F. AND COMPANY, INC	1	41
315	DUBOIS COMPANY INC	1	40
13	DUPERIAL S.A.	1	5
227	DUPLATE CORPORATION	1	35
51	DUPONT DE NEMOURS AND COMPANY	106	11 & 12
159	DUQUESNE LIGHT COMPANY	1	27
209	DURIRON COMPANY	2	32
82	EAGLE-PICHER LEAD COMPANY	2	16 & 40
179	EASTMAN KODAK COMPANY	20	30
238	ELI LILLY AND COMPANY	1	36
161	EL PASO NATIONAL GAS COMPANY	1	27
258	EMERY INDUSTRIES	2	37
101	EMPLOYERS' MUTUAL LIABILITY INSURANCE COMPANY	1	17
449	ENGINEERING ALLOYS DIGEST	1	51
104	EQUITABLE LIFE INSURANCE COMPANY	1	17
267	ERIE REGISTOR CORPORATION	1	38
123	ETHYL CORPORATION	6	21
438	EX-CELLO CO	1	50

No.	NAME OF COMPANY	NUMBER EMPLOYED	PAGE NUMBER
102	FACTORY INSURANCE ASSOCIATION	2	17
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245	FASSON, INC	1	36
92	FEDDERS-QUIGAN CORPORATION	1	36
415	FEDERAL GOVERNMENT (others)	16	48
208	FERRO CORPORATION	2	32
210	FERROTHERM COMPANY	1	32
317	FIBERBOARD PAPER PRODUCTS INC	1	40
97	FIREMAN'S FUND INSURANCE COMPANY	1	17
127	FIRESTONE TIRE AND RUBBER COMPANY	17	22
83	FITZPATRICK BROTHERS INCORPORATED	1	16
363	FLOVER CORPORATION, LTD	2	43
395	FOMAC ENGINEERS	1	45
342	FOOD MACHINERY	6	33
259	FOOTE MINERAL COMPANY	1	37
43	FORD MOTOR COMPANY	1	9
340	FOSTER GRANT COMPANY INC	1	42
371	FOXBORO COMPANY	1	44
339	FRANKLIN GLUE COMPANY	2	42
90	FREY YENKING PAINT COMPANY	1	16
318	FRONTIER CHEMICAL COMPANY	2	40
64	GARDNER BOARD AND CARTON COMPANY	2	15
389	GENERAL AMERICAN TRANSPORTATION CORP	1	44
180	GENERAL ANILINE AND FILM CORPORATION (ANSCO)	4	30
28	GENERAL ELECTRIC COMPANY	27	7
218	GENERAL FOODS CORPORATION	2	34
260	GENERAL MILLS	1	37
41	GENERAL MOTORS CORPORATION	26	9
14	GENERAL PETROLEUM COMPANY	1	5
206	GENERAL REFRACTORIES COMPANY	I	32
457	GENERAL TILE COMPANY	1	51
42	DENERAL TIRE AND RUBBER (AEROJET)	8	9
350	GETZ, WILLIAM CORPORATION	1	42
319	GIBSON HOMANS COMPANY	1	40
320	GIRDLER CORPORATION	2	40
76	GLIDDEN COMPANY	6	16
262	GLYCO CHEMICAL COMPANY	1	37
450	GOODMAN MANUFACTUEING COMPANY	1	51
52	B.F. GOODRICH COMPANY	43	13
	Chemical Division 27		
	Research Center 4		
	Tire Division 10		
	Gulf Chemical 1		14
	American Anode Div 2		14.
	Plastic Division 2		
1	GOODYEAR TIRE AND RUBBER	46	1
	Atomic Division 6		
	Tire & Chemical 37		
183	W.R. GRACE AND COMPANY, DAVISON CHEMICAL DIVISION	4	30
263	THE GRISCOM-RUSSELL COMPANY	1	37
139	GULF COAST RESEARCH LABS	1	23
15	GULF OIL COMPANY	2	5
399	GULF STATES SPECIALATIES COMPANY	1	45

181	HAGAN CORPORATION- HALL LABORATORIES INC.	4	30
94	HAMPTION PAINT MFG. COMPANY	1	16
194	HANKINS CONTAINER COMPANY	1	32
84	HANNA INDUSTRIAL FINISHES COMPANY	2	16
182	HARSHAW CHEMICAL COMPANY	3	30
98	HARTFORD FIRE INSURANCE COMPANY	1	17
264	HARWICH STANDARD CHEMICAL COMPANY	1	37
265	HAWAIIAN PINEAPPLE COMPANY	1	37
266	HEATING ENGINEER	1	37
184	HERCULES POWDER COMPANY	5	30
125	HEWITT SOAP COMPANY INC	2	21
85	HILTON-DAVIS CHEMICAL COMPANY	2	16
268	HOBART BROTHERS COMPANY	2	38
110	HOME INSURANCE COMPANY	1	17
321	HOME PRODUCTS INTERNATIONAL=	1	41
185	HOOKER ELECTROCHEMICAL COMPANY	8	30
269	HO-PAR INC	1	38
322	HOTPOINT INC	1	41
323	HOUDRY PROCESS COMPANY	1	41
434	WALTER HUBER COMPANY	1	50
401	HUNTINGTON LAB	1	45
391	HYDROCARBON RESEARCH, INC	1	45
531	Henry Weis Mfg., Co.	1	56
65	IMPERIAL PAPER AND COLOR COMPANY	1	15
246	INDUSTRIAL RAYON CORPORATION	7	36
362	INFILCO, INC	2	43
150	INLAND STEEL CORPORATION	2	25
105	INSURANCE COMPANY OF AMERICA	1	17
66	INTERCHEMICAL CORPORATION	1	16
143	INTERLAKE IRON CORPORATION	3	24
366	INTERNATIONAL ENGINEERING INC	1	43
270	INTERNATIONAL MINERALS AND CHEM CORP	1	38
271	INTERNATIONAL NICKEL COMPANY, INC	1	38
195	INTERNATIONAL PAPER COMPANY	1	32
462	INTERNATIONAL SHOE MACHINE CORP	1	51
272	IOWA METHODIST HOSPITAL	1	38
189	IRONSIDES COMPANY	1	31
531	INDUSTRIAL NUCLEONICS	# 3	56
388	JANITROL DIVISION	1	44
325	JEFFERSON CHEMICALCOMPANY	1	41
326	JEFFERY MANUFACTURING COMPANY	1	41
273	JOANNA WESTERN MILLS	2	38
324	JOHNS-MANVILLE CORPORATION	1	41
274	JOHNS MANVILLE INTERNATIONAL CORP	1	38
327	HERRICK L. JOHNSON INC	1	41
144	JONES LAUGHLIN	2	24
341	KAISER ALUMINUM COMPANY	1	42
151	KALSEY-HAYES COMPANY (STEEL PRODUCTS ENGR. CO)	1	25
219	KEEVER STARCH COMPANY	1	34
200	KELLEY ISLAND LIME AND TRANSPORT CO	1	32
359	KELLOGG, M.W., CO	2	43
456	KEWANEE-ROSS CORP	1	51
442	KILGORE MFG	1	50
523	WARREN F KIMBALL INSURANCE	1	55
195	KIMBERLE-CLARK	1	32

328	KING POWDER COMPANY	1	41
204	KNIGHT, MAURICE A., COMPANY	1	32
23	KOPPERS COMPANY	15	6
87	LACQUER PRODUCTS, INC	1	16
237	LAKE ERIE PHARMACIAL	1	36
228	LAMB GLASS COMPANT	1	35
231	LIBBEY-OWENS-FORD GLASS COMPANY	5	35
367	LIDELL ENGR. SERVICE	1	43
88	LILLY VARNISH COMPANY	1	16
33	LINCOLN ELECTRIC COMPANY	1	7
275	LINDBERG ENGINEERING COMPANY	1	38
445	LINE MATERIAL COMPANY	1	50
460	LINK BELT COMPANY	1	51
16	LION OIL COMPANY	1	5
220	THOMAS J LIPTON	1	34
421	LOCKHEED AIRCRAFT CORPORATION	1	49
17	LUBRIZOL CORPORATION	6	5
145	LUKENS STEEL COMPANY	1	25
56	MAC GREGOR GOLF AND SPORTS PRODUCTS inc	1	14
18	MAGNOLIA PETROLEUM CORPORATION	1	5
174	MALLINCKRODT CHEMICAL WORKS	4	29
276	MANGILL CHEMICAL COMPANY	1	38
57	MANSFIELD TIRE AND RUBBER COMPANY	1	14
106	MANUFACTURERS MUTUAL FIRE INSURANCE COMPANY	1	17
201	MARBLEHEAD LIME COMPANY	1	32
329	MARGAR COMPANY	1	41
152	MARION IRON AND METAL COMPANY	1	25
422	THE GLENN L MARTIN COMPANY	2	49
277	MASONITE CORPORATION	1	38
230	MAYWOOD GLASS COMPANY	1	35
379	GEORGE MCCARTHY SALES, INC	1	44
278	MCKAY COMPANY	1	38
390	ARTHUR MCKEE	1	45
24	MEAD CORPORATION	13	6
280	MEADOWBROOK CORPORATION	1	38
136	MELLON INSTITUTE	1	23
369	MERCHANTS INDUSTRY	1	43
177	MERCK AND COMPANY	2	29
451	MERRILL COMPANY	1	51
154	METAL AND THERMIT CORPORATION	1	25
279	MINNESOTA MINING AND MANUFACTURING CO	2	38
463 to 519	MISCELLANEOUS NON-CHEMICAL COMPANIES such as jewelry, shoe agriculture, physician, psychiatrist, sales, motels, etc	56	52,53,54
376	MONJONNIER BROTHER COMPANY	1	44
211	MONSANTO CHEMICAL C ORPORATION	19	33
66	MORAINE PAPER COMPANY	1	15
343	MORTON SALT COMPANY	1	42
437	J.G. MULLIGAN COMPANY	1	50
107	MUTUAL INSURANCE COMPANY	1	17
176	MYERS, F.E. AND BROS COMPANY	1	29

428	N.A.C.A., RESEARCH LABS	1	49
281	NARMCO RESINS AND COATINGS COMPANY	1	38
96	NATIONAL BOARD OF FIRE UNDERWRITERS	2	17
413	NATIONAL BUREAU OF STANDARDS	2	47
191	NATIONAL CASH REGISTER COMPANY	8	31
282	NATIONAL DISTILLERS CHEMICAL CORP	1	38
190	NATIONAL LEAD COMPANY	6	31
198	NATIONAL LIME AND STONE COMPANY	1	32
67	NATIONAL NEWSPRINGT AND PAPER MILLS	1	15
222	NATIONAL STARCH PRODUCTS, INC	6	34
411	NAVAL ORDANCE TESTING STATION	6	47
410	NAVY	10	47
223	NNESTLES INC	4	34
452	NEWARK STOVE COMPANY	1	51
192	NEW JERSEY ZINC	1	31
178	NEW YORK AND PENNSYLVANIA COMPANY, INC	1	29
377	NICHOLS ENGR AND RESEARCH CORP=	1	44
423	NORTH AMERICAN AVIATION INC	7	49
283	NORTH AMERICAN COAL CORPORATION	1	38
344	NORTH AMERICAN SOLVAY, INC	1	42
108	NORTH BRITISH AND MERCANTILE INSURANCE CO	1	17
109	NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY	2	17
175	NORTON COMPANY	1	29
89	O'BRIEN CORPORATION	1	16
527	OHIO DEPARTMENT OF HEALTH	3	55
68	OHIO BOXBOARD COMPANY	2	15
199	OHIO HYDRATE AND SUPPLY COMPANY	1	32
525	OHIO INSPECTION BUREAU	3	55
284	OHIO MATCH COMPANY	1	38
19	OHIO OIL COMPANY	3	5
58	OHIO RUBBER COMPANY	1	14
448	OHIO SEAMLESS TUBE COMPANY	1	50
526	STATE OF OHIO	9	55
439	OIL REFINERY	1	50
122	OLIN MATHIESON CHEMICAL COMPANY	26	21
61	O'SULLIVAN RUBBER CORPORATION	1	14
233	OWENS -CORNING FIBERGLASS CORPORATION	7	35
232	OWENS-ILLINOIS GLASS COMPANY	6	35
69	OXFORD PAPER COMPANY	1	15
458	PAINT RESEARCH ASSOC	1	51
62	PARA RUBBER COMPANY	1	14
45	PARKE-DAVIS COMPANY	10	10
360	RALPH M PARSONS COMPANY	2	43
345	PATEKOL PRODUCTS, INC	1	42
524	PATENT ATTORNEYS INDEPENDENT	3	55
454	PENNA INDUSTRIAL CHEM CO	1	51
46	PENNSYLVANIA GLASS SAND CORP	1	10
48	PENNSYLVANIA SALT MANUFACTURING	1	10
285	PERFECT CIRCLE COMPANY	1	39=
330	PERMAFLEX MOLD COMPANY	1	41
459	PERMUTTIT CO	1	51
188	PETROLITE CORPORATION	2	31
239	PFIZER AND COMPANY	1	36
346	PHILADELPHIA QUARTZ COMPANY	1	42
50	PHILLIPS PETROLEUM COMPANY	8	10

240	PITMAN-MOORE COMPANY- ALLIED LABORATORIES	1	36
229	PITTSBURGH PLATE GLASS	1	35
120	PLANET OIL AND REFINING COMPANY	1-	20
287	PLUMER LEATHER COMPANY	1	39
393	PODBEILNIAK COMPANY	1	45
394	POLAROID-CORPORATION	1	45
119	PONTIAC REFINING CORP	1	20
347	POTASH COMPANY OF AMERICA	1	42
443	POWER COMPANY, c/o STEAM PLANT	1	50
153	PRESSED STEEL TANK CORPORATION	1	25
368	PRITCHARD AND ABBOTT ENGRS	1	43
370	PRITCHARD, J.F. AND Co	1	43
47	PROCESS RESEARCH INC	1	10
49	PROCTOR AND GAMBLE COMPANY	16	10
20	PURE OIL COMPANY	6	5
63	PYRAMID RUBBER COMPANY	1	14
70	RAYONIER, INC	1	15
130	R.C.A. RUBBER COMPANY (ALSO ECLAT RUBBER)	2	22
455	RCA VICTOR CORPORATION	2	51
426	REACTION MOTORS INC	1	49
288	REILLY TAR AND CHEMICAL CORPORATION	2	39
289	REMMINGTON ARMS COMPANY	1	39
146	REPUBLIC STEEL CORPORATION	11	25
290	RESI CHEMICAL CORPORATION	1	39
29	RESISTANCE WELDES CORPORATION	1	7
121	RICHFIELD OIL CORPORATION	1	20
331	H.H. ROBERTSON COMPANY	1	41
427	ROCKETDYNE	1	49
522	ROYAL LIVERPOOL GRLUP INSURANCE	1	55
291	ROCKY MOUNTAIN ARSENAL	1	39
292	ROYAL TYPEWRITER COMPANY	1	39
71	SARG PAPER COMPANY	1	15
378	SARGENT, E.H. AND COMPANY	1	44
453	O.M. SCOTT AND SONS	2	51
293	SEARLE, G.D. AND COMPANY	1	39
294	SECRODS COMPANY=	1	39
406	SELF EMPLOYED (M.HURWITZ) public account	1	45
295	SHELLMAR PROD COMPANY	1	39
117	SHELIOIL COMPANY AND CHEMICAL Shell Oil Division 7 Shell Chem. Division10 Shell Development 3 Pipe Line Division 1	21	20
77	SHERWIN-WILLIAMS COMPANY	4	16
30	SHOCKLEY SEMICONDUCTOR LABORATORY	1	7
21	SINCLAIR RESEARCH LABS, INC	3	5
348	SINCLAIR VALENTINE COMPANY	1	42
115	SKELLY OIL COMPANY	2	18
112	SOCONY MOBIL AND SOCONY VACUUM OIL COMPANY	12	18
114	SOHIO CHEMICAL COMPANY	13	19
403	SOUTHWESTERN ENGINEERING COMPANY	1	45
135	SOUTHWESTERN RESEARCH INST	2	23
349	SPEPCO INC	1	42
59	SPONGE RUBBER CORPORATION OF AMERICA	1	14

241	SQUIBB COMPANY, E.R.	2	36
373	STAHL INDUSTRIES INC	1	44
296	STALEY, A.E. MANUFACTURING COMPANY	1	39
224	STANDARD BRANDS INC	2	34
116	STANDARD OIL OF CALIFORNIA	6	19
	Standard Oil of Calif 2		
	California Res Corp 3		
	Oronite 1		
115	STANDARD OIL OF INDIANA	18	19
111	STANDARD OIL COMPANY OF NEW JERSEY	20	18
	Esso Standard Oil and Esso Research and Engineering 15		
	Humble Oil and Refining 2		
	Enjay Company Inc 1		
297	STAUFFER CHEMICAL COMPANY	1	39
242	STERLING DRUG, INC	1	36
78	ST JOSEPH LEAD COMPANY	1	16
380	STONE AND WEBSTER ENGR. CORP	1	44
72	ST REGIS PAPER COMPANY	1	15
298	STROMBERG-CARLSON COMPANY	1	39
332	SUNBEAM CORPORATION	1	41
299	SUNNEN PRODUCTS	1	39
22	SUN OIL PRODUCTS	5	5
300	SURBURBAN COMPANY	1	39
387	SURFACE COMBUSTION CORPORATION	1	44
31	SYLVANIA ELECTRIC PRODUCTS, INC	3	7
301	TAYLER CORPORATION	1	39
357	TAYLOR INSTRUMENT COMPANY	6	43
416	TEACHERS HIGH SCHOOL	10	3B
405	TECHNICAL ENTERPRISE INC	1	45
214	TEXAS COMPANY	3	34
425	THIKOL CORPORATION	3	49
392	THOMAS, A.H. COMPANY	1	45
404	THOMAS CHEMICAL COMPANY	1	45
424	THOMPSON AIRCRAFT PRODUCTS	1	49
302	TIMKIN ROLLER BEARING COMPANY	3	39
60	TIRE REDUCING CORPORATION	1	14
429	TITANIUM METALS CORPORATION	1	50
384	TOLEDO SCALE COMPANY	1	44
456	UDYLITE CORPORATION	1	51
397	UHLMAN ASSOCIATES	1	45
73	UNION BAG AND PAPER COMPANY	2	15
355	UNION CARBIDE CORPORATION	72	26
	Bakelite Division 2		
	Electromet division 4		
	International Carbide 6		
	Linde Air Products Div 5		
	National Carbon Comp 11		
	Nuclear Division 5		
	Silicone Division 2		
	Visking Corp 2		
	Union Carbide Chemicals Co 35		

		No.Ch.E.	Page No.
118	UNION OIL COMPANY OF CALIFORNIA	6	20
5	UNIVERTIES	55	3 & 3B
	Foreign Teachers	9	4
243	UPJOHN COMPANY	1	36
407	U.S.A.F. AIR RESEARCH AND DEVELOPMENT	14	46
202	U.S. GYPSUM COMPANY	5	32
286	U.S. PHOSPHORIC PRODUCTS DIVISION	1	39
128	U.S. RUBBER COMPANY =	7	22
140	U.S. STEEL CORPORATION	16	24
	Steel Corporation 12		
	American Steel and Wire 2.		
	National Tube 2		
207	U.S. STONE WARE COMPANY	2	32
532	United Gas and Engineering	1	56
430	VIRGINIA SMELTING	2	50
444	VITA VAR CORPORATION	1	50
431	VULCAN DETINNING COMPANY	1	50
432	VULCAN STAMP AND MFG. COMPANY	1	50
433	WALLACE AND TIERNAN COMPANY	1	50
520	WATER SEWAGE AND MUNICIPAL	9	54
	City and Muncipalities		
461	THE WATT CAR AND WHEEL COMPANY	1	51
126	WERK SOAP COMPANY	2	21
32	WESTINGHOUSE ELECTRIC CORPORATION	3	7
74	WEST VIRGINIA PULP AND PAPER COMPANY	6	15
75	WEYERHAEUSER TIMBER COMPANY	1	15
147	WHEELING STEEL CORPORATION	1	25
435	WHITE DENTAL MFG COMPANY	1	50
381	WHITING CORP	1	44
148	WIERTON STEEL COMPANY	2	25
333	GEORGE L WILLIAMS COMPANY=	1	41
436	WOLF JACQUES AND COMPANY	1	50
95	WOOSTER FINISHES CORPORATION	1	16
196	WRENN PAPER COMPANY	1	32
173	WYANDOTTE CHEMICAL COMPANY	9	29
149	YOUNGSTOWN SHEET AND TUBE COMPANY	1	25

APPENDIX VII

Publications, Original and Creative A

Publications - Robert S. Brodkey

BOOKS

1. Fluid Motion and Mixing, Chapter 2 (110 pages) of Mixing: Theory and Practice, Vol. 1, Uhl and Gray Edts., Academic Press, Inc.

2. The Phenomena of Fluid Motions (730 pages), Addison-Wesley Pub. Co. (1967).

PUBLICATIONS

1. Heat Transfer in Condensation „ Effect of Temperature Variation Around a Horizontal Tube, Ind. Eng. Chem., 44, 2962 (1951) with L.A. Bromley.

2. Radiant Freeze Drying, Summaries of Doctoral Disseration, University of Wisconsin, 14, 471 (1954).

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3. Safety Problems in the Study of Hazardous Reactions, Ind. Eng. Chem., 48, 223 (1956), with J. Steward and R.G. Newberg.

4. Article above abstracted, translated and reprinted in Teknisk Tidskrift, Nov. 20, 1956, page 1014.

5. New Areas of Chemical Engineering with Emphasis on Petrochemicals, News in Engineering, 31, 13 (June 1959).

6. Nuclear Chemical Engineering Research, News In Engineering, 32, 3 (1960), with C.E. Dryden.

7. Fluidized Calcination of Simulated Aluminum-type Wastes, Industrial and Engineering Chemistry, 52, 795 (1960), with Jackson, Sorgenti and Wilcox.

8. Turbulent Flow of non-Newtonian Materials, A.I.Ch.E. Journal, 7, 392 (1961), with J. Lee and R.E. Chase.

9. Forced Convection from a Horizontal Cylinder, A.I.Ch.E. Journal, 7, 531 (1961), with E.R. Purves.

10. Evaluation of a 6-inch Oldershaw Distillation Column, News in Engineering, 33, 15 (Nov. 1961).

11. Measurement of the Flow of Molten Polymers through Short Capillaries, J. Appl. Polymer Sci., 7, 399 (1963), with A.P. Metzger.

12. A Kinetic Interpretation of non-Newtonian Flow, J. Appl. Phys., 33, 2269 (1962), with D.A. Denny.

13. Translating Terms for non-Newtonian Flow, Ind. Eng. Chem., 54 No. 9, 44 (1962).

14. On the Broseko Relations for Turbulent Flow, Appl. Sci. Res., 11A, 109 (1962), with J. Lee.

15. Heat and Momentum Transfer in Laminar Flow: Helium, Initially at Plasma Temperatures, A.I.Ch.E. Journal, 9, 49 (1963), with R.J. Wetherm.

16. Limitations on a Generalized Velocity Distribution, A.I.Ch.E. Journal 9, 448 (1963).

17. Light Probe for the Measurement of Turbulent Concentration Fluctuations, Rev. Sci. Instrs., 34, 1086 (1963), with J. Lee.

18. Turbulent Motion and Mixing in a Pipe, A.I.Ch.E. Journal, 10, 187 (1964), with J. Lee.

19. An Analysis of Geometry and Pressure Drop for the Horizontal, Two-phase Annular Flow of Water and Air in the Entrance Region of a Pipe, Chem. Eng. Sci., 19, 261 (1964), with L.A. Jacowitz.

20. Water Desalination in a Fluidized Bed, Ind. and Eng. Chem., April 1964, pages 34-37, with J. Kanyok.

21. Turbulent Motion and Mixing in a Pipe, A.I.Ch.E. Journal, 12, 403 (1966).

22. Dye Injection at the Centerline of a Pipe, A.I.Ch.E. Journal, 12, 817 (1966), with J.P. Gegner.

23. Light Probe for the Measurement of Turbulent Concentration Fluctuations, Rev. Sci. Instrs., 38, 26 (1967), with J.O. Nye.

24. The Scalar Spectra in the Viscous-Convective Subrange, J. Fluid Mech., 29, 151 (1967), with J.O. Nye.

25. Areas of Specialization in Chemical Engineering, Chem. Eng. Prog., 63 No. 10, 21 (1967).

26. A Kinetic Approach for Polymer Solution Data, A.I.Ch.E. Journal, 14, 61 (1968), with H.T. Kim.

27. A Visual Study of the Wall Region in Turbulent Pipe Flow, J. Fluid Mech., (in press), with E.R. Corino.

28. Thixotropic Behavior of a Colloidal Suspension, 5th Int. Cong. on Rheology, Kyoto (to be published in transactions), with L.G. Jones.

29. A Kinetic Interpretation of Time-Dependent Polymer Rehology Data, 5th Int. Cong. on Rheology, Kyoto (to be published in transactions), with W.E. Lewis.

30. Prediction of Flow Patterns in Horizontal Two-Phase Pipe Flow, (pending), with D.E. Saunders and J.N. Al-Sheikh.

C. Patents

1. U.S. 2,814,639 Dimethylol-Tricyclodecanol Esters and Process.

2. U.S. 2,839,580 Preparation of Diethyl Ketone.

3. U.S. 2,846,464 Oxo Synthesis of Alcolols.

4. U.S. 2,875,244 Dicarboxylic Acids from Dicyclopentadienes.

5. U.S. 2,876,264 Plasticizer Alcohols by Oxo Process.

6. U.S. 2, 936,295 Thermal and Mechanical Stable Latices of Isoolefin-Multiolefin Rubbery Polymers and Process for Preparing Same.

7. U.S. 2,955,094 Stable Isoolefin-Multiolefin Rubbery Latices Prepared with Ortho-Phosphoric Acid and Organic Sulfate Salts.

8. U.S. 2,973,309 Stable Butyl Latices.

9. U.S. 2,976,271 Propylene Polymerization.

10. U.S.3 ,293,539 Gem Dimethylol Alicyclic Esters.

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1. C.E. Dryden, "Ternary Liquid and Binary Vapor-Liquid Systems," Ind. Eng. Chem. 35,492 (1943).
2. C.E. Dryden, D.A. Strang, and A.E. Withrow, "Mass Transfer at Low Reynolds Numbers," Chem. Eng. Progress 49, 191 (1953).
3. C.E. Dryden, and W.B. Kay, "Kinetics of Batch Adsorption and Desorption," Ind. Eng. Chem. 46, 2294 (1954).
4. L.O. Alford and C.E. Dryden, "In an Emergency, Construct Your Own Control Valve," Chem. Eng. 61, (9): 226 (September, 1954).
5. C.E. Dryden, "Economics of Shipping Spent Nuclear Fuels," Nucleonics 14 (7): 77 (1956).
6. C.E. Dryden, and J. M. Frame, "Batch Versus Continuous Processing of Homogeneous Reactor Fuels," Chem. Eng. Prog. 52 (9): 371 (1956)
7. C.E. Dryden,"College Programs in Nuclear Engineering Education, Journal of Engineering Education 47 (5): 470 (1957).
8. B.D. Giles, C.E. Dryden, and C. E. Lapple,"A Study of Entrainment and Leakage in Slat-Tray Towers by Means of Radioactive Tracers," News in Engineering, Ohio State University, 29 (2): 7 (1957).

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9. F. C. Vilbrandt and C.E. Dryden, "Chemical Engineering Plant Design," McGraw-Hill Book Co., Inc., New York, 1959.
10. Editor, "Process-Plant Design Problems Used by Chemical Engineering Schools in the United States and Canada," A.I.Ch.E. Education Projects Committee. To be published in Spring, 1961.
11. "Process Control Instrumentation Costs", Chemical Engineering, January 11, 1960, p. 124.
12. M.J. Winfield and C.E. Dryden, "Chemical Engineering Cost Handbook", Chem. Eng. 69 (26): 100, Dec. 24, 1962.
13. C.E. Dryden and Robert S. Brodkey, "Nuclear Chemical Engineering Research," News in Engineering, Ohio State University, Vol 12 (1): 3, Feb., 1960.
14. C.E. Dryden, E. A. Trabant, and R. J. Martin, "Evaluation of AEC Equipment Grant Program"; Journal of Engineering Education, 51 (5): 396 (February, 1961
15. G.H. Kesler, J. H. Oxley, and C.E. Dryden, "Use of Heat and Mass Transfer Model Studies in the Evaluation of Rates of Deposition of Metals in Complex Systems," Trans. AIME 221 (2): 9 (February, 1961).
16. J. H. Oxley, J. E. Oberle, C.E. Dryden and G. H. Kesler, "Metal Deposition in Filament Bundles", Trans. AIME 221 (10): 972 (October, 1961).
17. K.A. Scheller and C.E. Dryden,"Free-Convection Heat and Mass Transfer in Chemically Reacting Gases Confined Between Vertical Parallel Plates"; Trans. 5th National A.I.Ch.E.-ASME Heat Transfer Conference, Houston, Texas August 5-8, 1962.
18. L.R. Steele, D. Carson, and C.E.Dryden, "Solution to the Fission Recoil Energy Deposition in a Slurry by the Monte Carlo Technique", Accepted for Publicatic in Nuclear Science and Engineering, 1963.
19. L. R. Steele, S. Gordon and C.E. Dryden, "Water Decomposition by Fission Fragment Recoil Energy in an Aqueous Slurry of Uranium-Thorium Oxides,"Ibid.
20. C.E. Dryden "Shall we Abandon Chemical Technology", Preprinted for A.I.Ch.E. National Meeting Chicago 1962-Session on Controversial Issues in Chemical Engineering Teaching.
21. U.S. 2,511,428 - Antioxidants.
22. U.S. 2,511,427 - Stabilizing Oleaginous Materials.
23. U.S. 2,434,790 - Stabilizing Fatty Materials.
24. U.S. 2,461,807 - Stabilization of Fatty Materials.

1. Co-authored and/or edited several classified reports concerning effects of atomic weapons; presented three papers (two published) on nuclear instrumentation;heterogeneous reaction kinetics (A.I.Ch.E. Journal, May 1963.

2. Mathematical modeling (Mining Engineering, June 1967; Fourdrinier Paper Machine Dynamics in "American Paper Industry" October, 1968)

3. Model building techniques, Spring 1968 Symposium on Computer Applications in Mining, Col.) Analog simulation of grinding circuit control (Symposium on Comp. Appl. in Mining, Tuscon, 1965, Vol. 3).

4. A mathematical model for ball mill grinding (two papers in preparation based on Horst's work).

RESEARCH PUBLICATIONS OF CHRISTIE J. GEANKOPLIS

1. Geankoplis, C.J. and Hixson, A.N.,,"Mass Transfer Coefficients in an Extraction Spray Tower," Ind. Eng. Chem., 42, 1141 (1950)

2. Geankoplis, C.J., Wells, P.L., and Hawk, E.I., "Extraction in a Pilot-Unit Spray Tower," Ind. Eng. Chem., 43, 1848 (1951)

3. Geankoplis, C.J. and Hixson, A.N., "Control of Small Liquid Flows Using Glass Valves," Ind. Eng. Chem., 44, 589 (1952)

4. Geankoplis, C.J. "Spray Tower Extraction," Ind. Eng. Chem., 44, 2458 (1952)

5. Vogt, H.J. and Geankoplis, C.J., "Distribution of Formic Acid Between Water and Methyl Isobutyl Ketone," Ind. Eng. Chem., 45, 2119 (1953).

6. Kreager, R.M. and Geankoplis, C.J., "Effect of Tower Height on Solvent Extraction Tower," Ind. Eng. Chem., 45 2156 (1953)

7. Vogt, H.J. and Geankoplis, C.J., "Processing Variables in Solvent Extraction Towers," Ind. Eng. Chem., 46, 1763 (1954)

8. Weiser, R.B. and Geankoplis, C.J., "Lactic Acid Purification by Extraction," Ind. Eng. Chem., 47, 858 (1955)

9. Whitehead, K.E. and Geankoplis, C.J., "Separation of Formic and Sulfuric Acids by Extraction," Ind. Eng. Chem., 47, 2114 (1955)

10. Schlea, C.S. and Geankoplis, C.J., "Extraction of Iron, Cobalt, and Nickel Sulfates by Organic Liquids," Ind. Eng. Chem., 49, 1056 (1957)

11. Ling, W.C. and Geankoplis, C.J., "Liquid-Phase Esterification of Oleic Acid and Isobutyl Alcohol," Ind. Eng. Chem., 50, 939 (1958)

12. Strang, D.A. and Geankoplis, C.J., "Longitudinal Diffusivity of Liquids in Packed Beds," Ind. Eng. Chem., 50, 1305 (1958).

13. Bak, E. and Geankoplis, C.J., "Distribution Coefficients of Fatty Acids between Water and Methyl Isobutyl Ketone," Ind. Eng. Chem., Chem. and Eng. Data Series, 3, 256 (1958).

14. Scharf, E.J., and Geankoplis, C.J., "Liquid-Liquid Extraction Equilibrium Data of Cobalt Nitrate-Nickel Nitrate-Nitric Acid Solutions," A.I.Ch.E. Jn., 5, 76 (1959)

15. Petritis, V.E. and Geankoplis, C.J., "Phase Equilibria in 1-Butanol-Water-Lactic Acid System," Jr. of Chem. Eng. Data, 4, 197 (1959)

16. Steele, L.R. and Geankoplis, C.J., "Mass Transfer from a Solid Sphere to Water in Highly Turbulent Flow," A.I.Ch.E. Jr., 5, 178 (1959)

17. Seaton, W.H., and Geankoplis, C.J. "Theory of Solvent Extraction of Phospheric and Hydrochloric Acids," A.I.Ch.E. Jr., 5, 379 (1959).

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18. Liles, A. W. and Geankoplis. C. J., "Axial Diffusion of Liquids in Packed Beds and End Effects," A.I.Ch.E. Jr., 6, 591 (1960).

19. McAteer, P. J., Cox, R. W., and Geankoplis, C. J., "Extraction of Mixed Solutes: I. Separation of Formic and Hydrochloric Acids, II. Separation of Acetic and Sulfuric Acids," A.I.Ch.E. Jr., 7, 456 (1961).

20. Harris, R. W., and Geankoplis, C. J., "Extraction of Mixed Solutes: Separation of Propionic and Sulfuric Acids," Jr. of Chem. and Eng. Data, 7, 218 (1962).

21. Bidstrup, D. E., and Geankoplis, C. J., "Aqueous Molecular Diffusivities of Carboxylic acids," Jr. of Chem. and Eng. Data, 8, 170 (1963).

22. Williamson, J. E., Bazaire, K. E., and Geankoplis, C. J., "Liquid-Phase Mass Transfer at Low Reynolds Numbers," Ind. Eng. Chem. Fundamentals, 2, 126 (1963).

23. Hazlebeck, D. E., and Geankoplis, C. J., "Axial Dispersion in a Spray-Type Extraction Tower," Ind. Eng. Chem. Fundamentals, 2, 310 (1963).

24. Stahel, E. P., and Geankoplis, C. J., "Axial Diffusion and Pressure Drop of Liquids in Porous Media," A.I.Ch.E. Jr., 10, 174 (1964).

25. Traylor, E. D., Burris, L., and Geankoplis, C. J., "Mass Transport from a Uranium Sphere to Liquid Cadmium in Highly Turbulent Flow," Ind. Eng. Chem. Fundamentals, 4, 119 (1965).

26. Wilson, E. J., and Geankoplis, C. J., "Mass Transfer at Very Low Reynolds Numbers," Ind. Eng. Chem. Fundamentals, 5, 9 (1966).

27. Henry, Jr. P., Jr., Cunningham, R. S., and Geankoplis, C. J., "Diffusion of Gases in Porous Solids over a Thousand-Fold Pressure Range," Chem. Eng. Science, 22, 11 (1967).

28. Cunningham, R. S., and Geankoplis, C. J., "Diffusion in Three-Component Gas Mixtures in the Transition Region Between Knudsen and Molecular Diffusion," Ind. Eng. Chem. Fundamentals, 7, 429 (1968).

29. Cunningham, R. S., and Geankoplis, C. J., "Effects of Different Structures of Porous Solids on the Diffusion of Gases in the Transition Region," Ind. Eng. Chem. Fundamentals, 7, 535 (1968).

30. Perkins, L. R., and Geankoplis, C. J., "Molecular Diffusion in a Ternary Liquid System with the Diffusing Component Dilute," Chem. Eng. Science, 24, to be published (1969).

PAPERS GIVEN AT NATIONAL MEETINGS

1. "Mass Transfer Coefficients in an Extraction Spray Tower," Symposium of Ind. Eng. Chemistry Div. of American Chemical Society, Dec.,, 1949, Columbus, Ohio

2. "Axial Dispersion in a Spray-Type Extraction Tower," Eight Midwestern Mechnaics Conference, April, 1963, Cleveland, Ohio.

3. "The Adsorption Characteristics of the Polyamide Epoxy Resin System," 157th National Meeting of the American Chemical Society, April, 1969, Minneapolis, Minn.

Publications - E. R. Haering

1. "The Dehydrofluorination at 2,2 difluoropropane MSc. thesis, The Ohio State University, 1956.

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Isomerizing Paraffimic Naphthas U.S.P. 2,357,521

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7. Performed the process development and scale-up for the first "man-made" rubber that duplicated natural rubber

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*Indicates co-author

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